THE DIVERSITY AND EFFECTIVENESS OF INDUSTRIAL POLICIES IN EAST ASIA: A CASE STUDY OF THE REPUBLIC OF KOREA, MALAYSIA AND THAILAND 1960-1997

By

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Glossary of Abbreviations

ANU	Australian National University
APEC	Asia Pacific Economic Cooperation
APITD	Action Plan for Industrial Technology Development
ASEAN	Association of South East Asian Nations
BOB	Bureau of the Budget
BOI	Board of Investment
CBU	Completely Built-Up
DRAM	Dynamic Random Access Memory
EAM	East Asian Miracle
EOI	Export Oriented Industrialization
EPB	Economic Planning Board
ERP	Effective Rate of Protection
FDI	Foreign Direct Investment
FIC	Foreign Investment Committee
FTZs	Free Trade Zones
GDP	Gross Domestic Product
GNP	Gross National Product
HAN	Highly Advanced National Project
HCI	Heavy and Chemical Industry
HICOM	Heavy Industries Corporation of Malaysia
HRD	Human Resource Development
IC	Integrated Circuit
ICA	Industrial Co-ordination Act
IE	Industrial Estate
IEAT	Industrial Estate Authority of Thailand
IFCT	Industrial Finance Corporation of Thailand
IMF	International Monetary Fund
IMP	Industrial Master Plan
IRPA	Intensification of Research in Priority Areas Programme
ISI	Import Substitution Industrialization
ISIC	International Standard Industrial Classification
ITAF	Industrial Technical Assistance Fund
JICA	Japanese International Cooperation Agency
JPPCC	Joint Public-Private Consultative Committee
KAIST	Korea Advanced Institute of Science and Technology
KIST	Korea Institute of Science and Technology
KIT	Korea Institute of Technology
KLOFFE	Kuala Lumpur Options and Financial Futures Exchange
KLSE	Kuala Lumpur Stock Exchange
KSTIC	Korea Scientific and Technological Information Centre
KTAC	Korea Technology Advancement Corporation
LDC	Less Developed Country
LMWs	Licensed Manufacturing Warehouses
MARA	Majlis Amanah Rakyat - Council of Trust for the People
MBC	Malaysian Business Council
MEXPO	Malaysian Export Promotion Organization
MIDA	Malaysian Industrial Development Authority
MIDF	Malaysian Industrial Development Finance
MIGHT	Malaysia Industry Government Group of High Technology

MIMOS	Malaysian Institute for Microelectronics Systems
MITI	Ministry of International Trade and Industry
MOF	Ministry of Finance
MOST	Ministry of Science and Technology
MOSTE	Ministry of Science Technology and Energy
MTDC	Malaysian Technology Development Corporation
MTI	Ministry of Trade and Industry
NCMMT	National Center for Metals and Materials Technology
NDP	National Development Policies
NECTEC	National Electronics and Computer Technology Centre
NEP	New Economic Policies
NEPR	Net Export Performance Ratio
NESDB	National Economic and Social Development Board
NICs	Newly Industrializing Countries
NIEs	Newly Industrializing Economies
NPC	National Productivity Corporation
ODM	Own-Designed and Manufacture
OECD	Organization for Economic Cooperation and Development
OEM	Original Equipment Manufacture
OPP1	First Outline Perspective Plan
OPP2	Second Outline Perspective Plan
PCC	Private Consultative Committee
POSCO	Pohang Iron and Steel Company
R&D	Research and Development
S&T	Science and Technology
SIRIM	Standards and Industrial Research Institute of Malaysia
SMEs	Small and Medium Scale Enterprises
SOEs	State Owned Enterprises
STDB	Science and Technology Development Board
TFP	Total Factor Productivity
TNC	Trans National Corporations
TTA	Technology Transfer Agreement
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Program
UNIDO	United Nations Industrial Development Organization
WLS	Weighted Least Squares

Overview

Diversity and the Effectiveness of Industrial Policies

The role of industrial policy is one of the contentious issues in applied economics. It is acknowledged in the literature that there exist a wide range of factors giving rise to deviations from the competitive market paradigm – sunk costs, economies of scale and scope, oligopoly, externalities and complementarities, information and coordination failures, and incomplete markets. The existence of these factors may justify government intervention to generate a more socially beneficial outcome. Yet, disagreements are evident on two main matters. Firstly, there is no uniform view regarding the empirical importance of these theoretical effects, and on the extent and relevance of deviations from the market paradigm in various types of economies. Secondly, arguments have been raised about the limitations on the potential role for the government to act effectively to produce a preferred outcome in the face of deviations from the market paradigm. Some argue that such deviations are limited and are more than offset by the likelihood of government failure, so that it will be rare for any improvement in economic activities to be achieved through industrial policies. Others argue that deviations from the market are pervasive and that in appropriate circumstances a strong and committed government can be very effective, so that there is a major role for industrial policies.

Against this background, assessments of the validity of industrial policy ultimately turn on empirical judgements rather than on theoretical differences. Economic theories, which are in many ways helpful in comprehending the complicated world critically and systematically, are inevitably built on highly simplified assumptions. But empirical judgements must come to grips with the diversity of real economies and industries, and of the many different types of market failure. A wide range of different policy measures and instruments have been applied to address these market failures. Quite different levels of competence exist in different governments and agencies implementing industrial policies, and a host of

exogenous factors other than the policy itself affect the overall economic outcome. Thus, forming well-founded empirical judgements and making justified assessments of the impact of policy are complex tasks.

This empirical challenge, and in particular that of carrying out empirical studies while incorporating this diversity, is central to assessing the effectiveness of industrial policies. A central theme of this thesis is that this diversity – in deviations from the market paradigm, in instruments, in national and industry conditions, in the competency of agencies and officials and in the factors affecting economic outcomes – must be fully taken into account in any assessment of the effectiveness of industrial policies.

It is argued below that existing empirical studies of the effectiveness of industrial policies in East Asia have largely ignored this important task. In addition, the existing empirical studies have so far failed to form a consensus view regarding the effectiveness of industrial policies in the East Asian case. In part, the inconsistent results of these studies can be ascribed to methodological differences – differences in the nature and scope of the studies – and to the lack of a uniform conceptual framework. The nature of the various studies – the basis on which the studies are carried out, for example, whether they are country-specific or cross-country studies – may have a significant influence on their outcomes. Naturally, if countries differ in some or all of the ways described above, the outcome of a cross-country study may differ from that of a country-specific study even if the same analytical techniques are applied. As will be clear in the review of empirical analyses of industrial policies in East Asia in Chapter 3, all except the *East Asian Miracle* report by the World Bank (1993) are country-specific studies. They have also applied a variety of analytical techniques, and show marked differences in scope and in the conceptual framework employed. Under these circumstances, and in the context of the diversity of market conditions, objectives, instruments and capabilities, the mixed outcome is not surprising. Nevertheless, almost all the empirical studies generalised their conclusions in terms of the effectiveness or ineffectiveness of industrial policies.

More specifically, our review of existing empirical studies highlights three specific problems with those studies. Firstly, all the studies except two based their conclusions on indirect evidence such as the aggregate performance of exports, economic growth and value-added for the country or countries concerned. Such aggregate outcomes could be influenced by many other internal and external factors. Therefore, the performance of such aggregate measures cannot be considered to be the outcome of industrial policies without some attempt to correct for the effects of these other factors. Secondly, without applying any systematic basis for identifying policy favoured and non-favoured industries, and the timing and intensity of support across industries, empirical analyses have been carried out while assuming that particular industries (often the heavy and chemical industries) are the policy favoured industries for all periods and countries studied. This general assumption is inappropriate since industry specific intervention is rarely practiced uniformly by a number of countries and even in a given country all the time. Thirdly, the general conclusions reached in these studies about the effectiveness of industrial policies have to be taken with care because of the diversity within countries. In addition to the wide range of deviations from the market paradigm cited in the theoretical literature and noted above, in practice many other diversities in industry policy application arise from country-specific factors. These include the development objectives pursued, the status of development of the country, the competence of government agencies, the nature of the political economy, the industrial structure and so on, as well as the variety of policy instruments and measures employed. These differences between countries may have a considerable influence on policy outcomes. Yet, ignoring these diversities, the effects of industrial policies have been evaluated by the existing empirical studies while assuming that the industrialisation process is a uniform, once and for all event.

The Structure of the Thesis

In this context, we consider that to assess the effectiveness of industrial policies appropriately it is important not only to identify these diversities for the country being analysed but also to ensure that this diversity is allowed for in the analytical methodology. The investigation of diversity and the effectiveness of industrial policies include in this thesis will contain three main parts. Part A involves a

theoretical review which discusses various approaches to the justification of industrial policy, the outline of the conceptual framework for the present investigation and an analytical review of existing empirical studies. Part B investigates the diversity and incidence of industrial policies in Asia in the light of experience of three sample countries, namely the Republic of Korea, Malaysia and Thailand. How industrial policies in these countries show diversities are examined primarily through an investigation of country-specific factors and of the diversity of policies implemented over the period of 1960-1997. In this exercise particular emphasis will be given to the incidence of industrial policies – *what industries, using what measures, for what purposes, at what time and to what extent, have been subjected to industrial promotion.*

Given the diversity, this study proposes that an appropriate strategy to assess the effectiveness of industrial policy requires three steps:

- measurement of the incidence of industrial policy in a given country and industry at a particular time;
- development of measures of the potential outcome of industrial policy, by excluding the effects of broader factors affecting the industries and countries concerned in the particular time periods; and
- assessment of the effectiveness of industrial policy, by studying whether there is evidence of an impact of policies with a given incidence pattern on the potential outcomes variables, for a given country.

Given the data constraints for the other countries, Korea is selected as a case study, and in Part C of this thesis a preliminary attempt is made to implement this assessment strategy quantitatively.

An examination of industrial policies in sample countries reveals that, in many respects, they demonstrate remarkable diversity, especially in the light of the common presumption of uniformity. As is evident from the detailed analyses of the incidence of industrial policies, the sample countries differ significantly, for example, in terms of the objectives of the industrial policies that they pursue, of their industrial structures, of the role of the private sector and of the level of competence of their government agencies. Though all the three sample countries have followed import substitution and export promotion measures more or less simultaneously, Korea has given priority to economic growth since late 1950s and has followed its policies with clearly outlined objectives such as promoting exports and industrial self-sufficiency. Thailand, though giving priority to economic growth like Korea, followed no such systematic and ambitious approach until at least the mid 1970s. Since then export promotion together with spatial balance of manufacturing industries have become the major motives for pursuing industrial policies. Concerted efforts for industrial promotion have been evident in Malaysia since early 1970s, but it has given priority to achieving social equity – stimulating *bumiputera* participation – at the expense of economic growth for nearly two decades. By encouraging Free Trade Zones and Licence Manufacturing Warehouses though attempts have been made towards promoting exports and increasing value-added since early 1970s, detailed policy attention on these policy objectives are evident in Malaysia with the introduction of Industrial Master Plan in 1986.

Similarly, both the industrial structure and the role and the strength of the private sector, factors which may have a significant influence on effective policy implementation and outcomes, also vary significantly between these countries. The industrial structure of Korea is dominated by a small number of large firms – mainly the *chaebols* which are family owned conglomerates. The private sector – both domestic firms, the majority are small and medium scale enterprises, and foreign firms – plays a dominant role in Thailand. Policy makers of both Korea and Thailand enjoy substantial autonomy in decision making (except the minor influences made through corruptive practices) are relatively free from the influence of interest groups. In

contrast to Korea and Thailand, state owned enterprises played a dominant role in the industrial structure of Malaysia until early 1980s, and policy makers in ethnically divided Malaysia are not fortunate enough to enjoy substantial autonomy in decision making.

Further, policy measures vary not only between countries but also within a given country over the observed period (1960-1997), since countries have to adjust their policies in response to internal and external changes, economic imbalances and emerging economic, social and technological developments. To cite some examples, industry specific intervention has not been uniform across these countries, nor within each country over the period. Korean evidence suggests that, starting with certain labour intensive industries such as textiles and electronics, industry specific intervention shifted towards the heavy and chemical industries until early 1980s. More intensive measures – such as preferential treatment, state initiated mergers and administrative guidance with performance standards – were also applied in Korea during the period to 1982. Since 1982, instead of placing emphasis on specific industries, policy attention in Korea has shifted towards promoting industries on an equal basis, while giving special attention to technologically advanced products. Systematic approaches to industry specific intervention were apparent in Malaysia only after 1981. Even then, Malaysia did not follow its policy measures as intensively in Korea, and tended to favour both resource and non-resource based industries. Industry specific intervention is less evident in Thailand than in either Korea and Malaysia, although since the early 1990s it has been taking steps towards promoting specifically selected industries. Likewise, significant differences are evident between these countries in terms of other policy measures, especially in regard to policies towards technology, finance and the promotion of foreign direct investment.

Finally, this diversity is further demonstrated in the evolution of industrial policy in Korea. As will be evident from the empirical analyses based on incidence measures, Korea has not followed a uniform approach when applying industrial policies. In general terms it is possible to conclude that Korean export promotion and growth related measures were biased toward the basic and fabricated metals industries and the chemical industry, while import substitution related measures – protective

measures – were largely tilted towards promoting light industries. Moreover, the incidence measures in Korea appear to be dynamic, in the sense that they tend to be frequently varied not only between industrial sectors but also over time, reflecting the changes in policy direction and also other social and economic adjustments. Thus, contrary to the general perception, the Korean evidence on incidence measures suggests that industry specific intervention has not been exclusively limited to the heavy and chemical industries. All this implies that careful investigation of incidence measures, preferably on a country-specific basis, would be appropriate for analysing the real impact of industrial policies.

Measuring the Incidence of Industrial Policies – the Case of Korea

The proposed strategy to address the effectiveness of industrial policy in the face of pervasive diversity has been outlined above, and in Part C this is applied to Korea in a preliminary analysis. The first two steps in the proposed methodology are to assess the incidence and the potential outcomes of industrial policies. These are undertaken for Korea in Chapters 8 and 9.

Incidence measures are studied in Chapter 8 for two types of policies, those directed primarily at promoting exports and growth and those directed primarily at import substitution. As might be expected, the available published data that can be brought to bear on the incidence issues are very limited. For the exports and growth policies, three measures are explored, across eight manufacturing industries at the two-digit level. The first is the incidence of financial and tax incentives, measured in terms of estimated subsidy effects on the cost of capital by industry. The second is a proxy for technology support programs, being the number of technology licensing projects approved by industry. The third measure of the incidence of policy support, especially relevant in Korea where foreign investment was strictly controlled, is the number of foreign direct investment projects approved by industry. In terms of import substitution policies, measures are available for the average nominal tariff rate and for the incidence of non-tariff barriers by industry.

These measures have severe limitations, but they do allow some broad conclusions to be reached about the incidence of industrial policies in Korea over the 1962-82 period. Firstly, it appears that there is no uniform pattern across different types of incidence measures applied for industrial promotion. Of the export and growth policies measured – tax and financial incentives and the measures adopted for promoting technology development – our results indicate that they were biased towards promoting the basic and fabricated metals and chemical industries. On the contrary, protective measures were tilted towards promoting light industries such as the food and textiles industries. However, caution is required regarding these conclusions, since the data representing incidence measures are proxies and may not reveal the true picture of the incidence of industrial policy.

Secondly, these incidence measures appear to be dynamic. They are quite frequently subject to change, not only from one industrial sector to other but also over time. These characteristics may partly attributed to changes in policy direction and also to other social and economic adjustments.

Thirdly, when the overall impact of industrial promotion is assessed by combining both export promotion and growth related and import substitution related measures, it is evident that a combination of both basic and fabricated metals industries, the chemical industry and light industries have been promoted over the others in the case of Korea. The comparatively high level of promotion received by the textiles sector suggests that industry specific intervention has not been exclusively limited to the Heavy and Chemical sector, as is often assumed.

Measuring the Potential Outcomes of Industrial Policies – the Case of Korea

As noted earlier, many factors affect economic outcomes in a particular country, both in overall terms and at the sectoral level. Many of these factors – such as global economic trends, technology shifts and macroeconomic and cyclical factors – affect virtually all countries. Thus it will be a mistake to treat actual economic outcomes as the potential outcomes of industrial policies, unless it is possible to correct for these common factors. In Chapter 9 we develop a response to this problem, referred to as

identifying the potential outcomes of industrial policies, by benchmarking Korea's economic performance at the sectoral level against that of comparable countries. More specifically, Korea's industrial sector performance in terms of value-added and exports, at the two-digit ISIC (International Standard Industrial Classification) level, is compared with that of selected benchmark countries over the period 1970-1996. Ideally, the comparison should be made with benchmark countries that had not pursued industrial policies extensively. Such a comparison would clearly distinguish the difference in performance between those which followed policy intervention intensively and those which did not. However, this becomes impossible due to the non-availability of both policy and outcome information at the sectoral level. In addition, practically every country follows some sort of industrial promotion policies and hence finding countries which do not follow such policies become an impossible task. Under these circumstances a group of developing countries, which exhibits similar characteristics with respect to initial per capita, industrial structure and industrial composition as compared with Korea, which have had a wide range of policy regimes and for which adequate data are available, have been selected as benchmark countries. The countries are Taiwan, India, the Philippines, Mexico and Chile.

After discussion of various alternatives, the two central benchmarking concepts adopted in Chapter 9 are industry value-added as a share of GDP and industry exports as a share of world exports in that industry. Korea's performance on these variables, relative to that of the benchmark countries, is used as a measure of the potential outcome of industrial policies. As may be expected, in several respects Korea's performance in relation to these benchmark countries is remarkable. The question now is the extent to which this striking performance can be attributed to industrial policies, the incidence of which has been studied in Chapter 8.

In the final chapter, Chapter 10, three empirical tests are applied to investigate this question. The results of the first two tests are consistent with the view that there was a strong impact of industrial policies on industrial performance in Korea over the period 1970-82, although the results of the third test are inconclusive.

The first test compares the aggregate industrial performance of industry groups in Korea, based on the incidence of export promotion and growth measures and of import substitution measures respectively, with that of similar groups in the benchmark countries. The outcome variables used are industry value-added as a share of GDP and industry exports as a share of world exports in that industry. The second test separates the period into the high intervention period (1970-82) and the period (1982-96) for which industry specific intervention was very much reduced, to assess whether relevant differences in performance can be observed in the two periods.

The results of these first two tests are summarised in Tables 1 and 2, and are very striking. For industry groupings defined in terms of export and growth measures (Table 1), the striking feature of the table, for both value-added and exports, is the big difference between Korea and the benchmark countries in the highly promoted group in the interventionist period. For these industries and this period, the value-added share rose by 5.9 per cent per annum in Korea but fell 0.3 per cent for the benchmark countries, while the export share rose by 15.9 per cent per annum for Korea but by only 2.1 per cent for the benchmark countries. For five of the other six cells shown in the table, the benchmark country growth rate was higher than that of Korea. It is only in exports in the less promoted group in the early period that Korea also has some margin over the benchmark countries. Thus for industry groups defined in terms of export and growth related measures, the stronger relative performance of Korea is heavily concentrated in the highly promoted industries in the interventionist period.

Table 1 Growth Rates by Policy Periods, 1970-82 and 1982-96
(Based on export promotion and growth related measures)

Industry Groups	Average Annual Rate of Growth (%)			
	Value-Added as a Share of GDP		Exports as a Share of World Exports	
	1970-82	1982-96	1970-82	1982-96
Highly Promoted Group				
Korea	5.9	3.5	15.9	2.1
Benchmark Countries	-0.3	3.7	2.1	4.2
Less Promoted Group				
Korea	0.6	0.1	6.8	-2.2
Benchmark Countries	0.8	1.9	3.6	0.8

Source: Estimates of the author based on Trade and Production data accessed through IEDB (ANU).

For industry groupings defined in terms of import substitution measures (Table 2), the estimates for both outcome variables and for both industry groups in Korea show comparatively higher performance during the high intervention period than thereafter. During 1970-82 the average annual rate of growth of both the value-added and the export share for both groups are also comparatively higher than that of the similar groups in benchmark countries. However, substantially opposing results are evident in Korea relative to the similar groups in benchmark countries for both industry groups after the high intervention period. For three of the four cells in Table 2 for the 1982-96 period, the growth rate of the relevant variable is higher in the benchmark countries than in Korea. But the key point here is there is no difference evident in the performance of the highly promoted and the less promoted industry groups – for both Korea's performance is stronger than that of the benchmark countries over 1970-82 and, with one marginal exception, weaker than that of the benchmark countries over 1982-96.

Table 2 Growth Rates by Policy Periods, 1970-82 and 1982-96
(Based on import substitution related measures)

Industry Groups	Average Annual Rate of Growth (%)			
	Value-Added as a Share of GDP		Exports as a Share of World Exports	
	1970-82	1982-96	1970-82	1982-96
Highly Promoted Group				
Korea	4.3	2.7	14.1	2.2
Benchmark Countries	0.9	3.2	3.5	3.1
Less Promoted Group				
Korea	4.7	1.8	10.0	-0.8
Benchmark Countries	-0.9	1.4	2.1	2.1

Source: Estimates of the author based on Trade and Production data accessed through IEDB (ANU).

Thus, there is a marked difference in the performance of Korean industries, relative to those of the benchmark countries, over the two periods, on most measures. However, for groupings defined in terms of export and growth measures, this was true for both outcome variables only for the highly promoted group. For groupings defined in terms of import substitution measures, there is little discernible difference between the comparative performance of the highly promoted and the less promoted group. These results are consistent with the view that industrial policies targeting exports and growth had a significant impact on Korean industrial development over the 1970-82 period. But they are not consistent with the view that industrial policies targeting import substitution had a similar impact, at least when assessed in terms of exports and value-added outcome variables. However, caution is required regarding these performance differences since both export promotion and import substitution measures have simultaneously been adopted in Korea.

The third test uses regression analysis on panel data for incidence and outcome variables, to test a simple model of the impact of policy measures on outcomes. While generally the variables have the expected sign, in most cases they fail standard

significance tests, and the results can at best be described as inconclusive. This is not surprising, given the severe limitations on the data available for this purpose. It is likely that a much more detailed panel data set, and perhaps a model which takes account of other factors influencing the relationship between incidence and outcome variables, would be necessary for the impact of industrial policy on sectoral outcomes to be assessed by rigorous econometric analysis within the overall framework suggested here.

Conclusion

This thesis has explored the impact of diversity – in deviations from the market paradigm, in instruments, in national and industry conditions, in the competency of agencies and officials and in the factors affecting economic outcomes – on the assessment of the effectiveness of industrial policies, with special reference to East Asia. The relevance of this diversity has been illustrated in the theoretical literature related to the justification of industrial policy and in the practice of Korea, Thailand and Malaysia. It has also been shown that the existing empirical literature on the effectiveness of industrial policy in East Asia largely ignores this critical fact.

A proposed framework for taking account of diversity in assessing the effectiveness of industrial policy has been developed, and has been applied in a preliminary way, and on the basis of limited data, to Korea. This application generates striking evidence consistent with the view that export and growth related policy measures were effective in Korea particularly over the period 1970-82, but inconsistent with the view that import substitution related policies were similarly effective, at least in terms of export and value-added outcomes. Not surprisingly, given the data limitations, a panel regression analysis was inconclusive. Overall, this application suggests that the proposed framework is sufficiently robust to justify a more detailed analysis, using unpublished data sources, if such data were available.

Part A: Diversity and the Theory of Industrial Policy

1. Industrial Policy and the Role of Government

1.1 Introduction

Economies, both developed and developing, use a vast array of policy measures to stimulate industries. Some policy measures, such as imposing tariffs, are applied for the purpose of protecting domestic industries from established rivals. Some other policy measures, such as providing tax or financial incentives, are employed for directing resources to, or for stimulating investments towards, export promotion, technology development or the reduction of regional imbalances. All these policy measures, which are in general referred to as industrial policies, tend to be more extensive in the case of developing countries. This may be due to the special circumstances of such countries, such as low private savings, dependence on primary product exports, declining terms of trade, small internal markets, limited skills, few entrepreneurs and so on. Many governments take the view that these circumstances force them to take on responsibilities far beyond those advocated by conventional economic theories, extending their role beyond economic management, directed to promoting growth and ensuring macroeconomic stability, to intervening in the allocation of resources and the development of firms and industries. More importantly, with the unprecedented economic as well as industrial growth of certain Asian countries, such as Japan, Korea[1] and Taiwan, many developing countries have taken a special interest in the application of industrial policies in East Asia in the 1980s.

Despite this interest and the widespread application of various industrial policy measures over a couple of decades, the term *industrial policy* is still surrounded with ambiguities. As a result, one cannot find in the literature a single accepted and unified interpretation of, nor indeed a precise definition of the concept of, industrial policy. Further, no consensus view has been yet established regarding the theoretical

[1] Hereafter Korea is used instead of the Republic of Korea or South Korea.

arguments supporting industrial policies. Some of the general issues – such as whether governments, through policy measures, can develop industrial activities more effectively than the market mechanism, and under what circumstances and on what grounds a government role in economic activities is justified – have been subjected to extensive discussion over the years. To be able to understand the role of government and of the market in general, and their relative roles in industrial development in particular, it may be worthwhile to review some of these theoretical considerations.

In this chapter, this particular task starts in Section 1.2, with a brief review of the neoclassical view and the classical infant industry argument about the role of government in industrial development. Then follows a review of recent theoretical approaches to the role of government in industrial development. Four recent approaches to the role of government are considered. Firstly, the theoretical rationales which stress the role of the government as complementary to the market are discussed under two themes, namely setting up new industries and the market enhancing view (Section 1.3). Next, other recent theoretical rationales, which emphasize the strategic role of government in industrial development on the basis of perceived inadequacy of market outcomes, are presented in Section 1.4. Some new growth models that explain how market outcomes could be sub-optimal and emphasize the potential role of policy intervention to obtain the social optimum are briefly discussed in Section 1.5. The development state view, which considers the role of government in the context of developing countries, is outlined in Section 1.6. The implications of these theoretical approaches for empirical work are briefly discussed in Section 1.7.

1.2 Industrial Policy and the Role of Government

This section presents two widely known theoretical views: the pure neoclassical view and the classical infant industry argument. The former assigns a dominant role for the market in economic activities while expecting a minor role from the government. A standard extension of that view, the classical infant industry argument, accepts newly established industries as the central exception to the pure reliance on market forces, and calls for government intervention to promote domestic infant industries.

1.2.1 The Neoclassical View

Government action is required in all the economies, for carrying out essential economic functions such as providing some physical infrastructure, supplying "public goods" such as defence and national security, the legal system and environmental protection, contributing to the development of institutions for improving markets for labour, finance, technology and so on. Economists generally accept a government role in these types of essential economic activities. To carry out these economic activities smoothly, functional measures, such as across-the-board R&D incentives, the provision of training facilities and incentives to develop a broad-based venture capital market are also widely accepted by economists. The neoclassical view, however, disputes the role of government intervention in resource allocation, especially in the case of the so-called industry specific intervention. Such activities may lead to political influence and rent seeking practices, and therefore will distort the price mechanism and lead to inefficiencies (Corden 1974; Smith 1995).

Neoclassical economists hold that prices determined in free markets will drive the economy to its maximum production potential and to overall economic efficiency. In a situation where the market is functioning effectively, they consider that the theory of comparative advantage will determine international trade and investment patterns, and thereby the optimum industrial development pattern for a particular country. Under this line of argument, a country would attain a higher level of welfare if it permitted trade at international prices, producing those commodities that are comparatively cheaper at home and exchanging them for those that would be relatively more expensive to produce. Promoting resource allocation as specified by this theory, countries will also be able to derive dynamic benefits in terms of learning-by-doing, technology acquisition and productivity growth, and will encourage resources to be employed efficiently by mobilizing them to most productive industries. Instead of extensive government intervention, therefore, the neoclassical economists stress the importance of good economic management – such as maintaining sound fiscal, monetary and financial policies – as crucial factors that determine the speed and sustainability of growth. The proper role of government is to

help to create and maintain an environment in which price signals can effectively determine resource allocation (Krueger 1990; Hughes 1993; Helleiner 1992).

The price mechanism in this sense plays a central role in determining resource allocation. Competition between private producers promotes the efficient use of resources. However, the smooth and efficient operation of the price mechanism requires certain conditions, such as perfectly competitive markets for all goods and services, the absence of externalities, free availability of relevant information, free entry and exit and so on. Under these assumed conditions, it is asserted that individual firms cannot influence the market price, and each firm takes prices as given by the market. Free entry and exit, into and from industries, ensures that there will be no "pure" profits. In the long run, the theory concludes that competitive market equilibrium will deliver the social optimum.

It is widely acknowledged that, in reality, there are many practical limitations to the operation of competitive markets. As specified by the theory, the price system is the mechanism by which the production decisions of firms are coordinated. To perform this signalling function, the price mechanism, among others, requires the sharing of information. In perfectly competitive markets, it assumes that information is freely available among economic agents and that they undertake economic activities so as to maximize their objectives. However, the market may provide information about the price and quantity of a good, but it may not be able to provide sufficient information about other relevant aspects, such as the quality or other characteristics of goods or of the range of prices available. In practice, therefore, one can find many situations where the market alone cannot find best possible outcome. In the case of financial markets, for instance, lenders who are concerned with maximizing their returns may, due to information asymmetries, allocate credit by a screening and evaluation process rather than by allocating credit to the highest bidder. Other frequently cited examples include investment involving strategic complementarities or mutual linkages. If investments involve large-scale commitments and many inter-linked technologies, no single entrepreneur may be able to bear the capital required for such investments. Where such heavy sunk costs are involved, contrary to the expectations of the theory, investment in certain economic activities may take place at

less than the social optimum. For instance, in the case of investment related to knowledge based activities, firms may invest less than social optimum either because they are unable to meet the sunk costs involved or they are unable to appropriate all the benefits. Likewise, the failure of any other condition assumed by the theory may lead to a failure of markets to be efficient, a situation which is often referred to as a market failure (World Bank 1993; Itoh et al. 1991; Kim and Ma 1996; Ledyard 1987).

Economists who have highlighted the practical limitations of markets on various grounds have challenged neoclassical theories in recent years. However, neoclassical economists initially responded to these market failures with an argument supporting the protection of so-called infant industries (see Section 1.2.2). Taking these arguments a step further, industrial policy advocates stress the importance of a rapid shift of industrial structure towards capital and knowledge intensive industries. Some of these industrial policy advocates such as (Wade 1988, 1990a, 1990b; Amsden 1989) have argued that government has the ability to handle some of the activities where market outcomes are limited by market failures.

However, many neoclassical economists do not accept these arguments produced in favour of industrial policies. In particular, they are sceptical about the government's ability to implement an efficient solution for solving market failures. Although they acknowledge the fact that there are certain inherent market failures and that in such a situation government interference could be necessary, they are in favour of implementing functional or across-the-board measures to overcome such market inefficiencies. They believe that such measures create less harmful effects on the economy than the measures advocated by industrial policy theorists.

Just as markets may fail, so there may also be government failures. Although there are theoretical grounds for government to intervene in certain economic activities, strong counterarguments also exist indicating possible government failures. That is, for various reasons government policy may be no more effective in reaching an efficient outcome than the market which it seeks to correct. One such argument is based on rent seeking. This argument contends that government intervention creates economic rents for parties that receive privileges (e.g. a monopolist position,

government directed credits or subsidies). The existence of these rents induces rent seeking activities that are socially wasteful.

Another major argument of this type is government information failure. To be able to rectify market impediments effectively, among other things government should be able to gather accurate information regarding the segment of the economy in which the functional impediment appears, as well as being able to determine the cause and extent of the distortion. Information related to private economic activities – technical knowledge of producers, consumer preferences, resource availability – is dispersed individually among producers, consumers and resource owners. Therefore, it may be impossible in practice for the government to make the original holders of such private information divulge it accurately and quickly (Itoh et al. 1991). Thus it may be impossible for the government to assemble the necessary information to intervene effectively.

Another source of market failure, and of potential government intervention, is coordination failures. But the coordination problems are more complex than is often assumed by the theoretical models. As Matsuyama (1996, p. 136) notes "coordination problems are inherently difficult; coordination failures are everywhere; whatever coordination mechanism is put in place, they are so pervasive that there is plenty of room for improvement". Even the most advanced economies fail in coordination and even the least developed economies achieve a certain degree of coordination. There may be a great variety in the manner in which different economies cope with the coordination problem. In fact, there may be situations where government, with its coercive power, can sometimes improve coordination. However, as Matsuyama notes:

> as a consequence of the fundamental difficulty of the coordination problem, it is inevitable that any mechanism, including the Invisible Hand of the price mechanism, supplemented by the Visible Hand of entrepreneurs and of bureaucrats, cannot find the efficient economic system. (1996, p. 145)

In other words neither the market nor the government alone may be able to find complete solutions for coordination failures.

In sum, as the previous discussion suggests, the neoclassical economists assign a dominant role for the market in economic activities. By contrast many others argue that, if there are increasing returns to scale, other nonconvexties, informational asymmetry, externalities, and significant market power on either the supply side or demand side of the economy, market forces alone will not assure the efficiency of the economy. Since there is a self-regulating mechanism involved with the market mechanism, it is considered that market outcomes could be improved with government support. Some recent theoretical approaches therefore advocate a role for government where markets are deficient, so as to generate an improved outcome. Some of these new theoretical rationales, which basically challenge neoclassical orthodoxy, will be discussed in the forthcoming sections of this chapter. A brief taxonomy of these theoretical rationales for industry policy, and the associated deviations from the pure competitive model, is provided in Table 1.1. In the face of these various rationales, however, many neoclassical economists will continue to stress the likelihood of government failure if an interventionist approach is adopted.

1.2.2 The Infant Industry Argument

The best known and most widely accepted rationale for government intervention in the industrial structure is the classical infant industry argument. This argument rests on dynamic learning effects which are presumed to be effective in shifting the economy's transformation curve over time, so that an industry that is not currently competitive may achieve comparative advantage after a temporary period of protection. Infant industries, as the proponents of this argument posit,[2] cannot compete successfully with more established foreign firms, due to lack of know-how and the initial small level of output. Temporary support from the government, mainly in the form of tariff protection, is then justified for these industries until they grow in scale and become 'mature' to the point where they can stand on their own feet.

[2] As cited by Leuedde-Neurath (1986, p. 19) the infant industry argument "was originally credited to Hamilton (1791) and to List, whose German book on this topic appeared in 1841. Yet the acceptance of the infant industry doctrine by orthodox economists only followed its endorsement by John Stuart Mill, who stated that the only case in which, on mere principles of political economy protecting duties can be defensible, is when they are imposed temporarily (especially in a young and rising nation) in hopes of naturalising foreign industry, in itself perfectly suitable to the circumstances of the country" (Mill 1848, p. 918).

Table 1.1 Theoretical Approaches to Industrial Policy

Rationales for Industrial Policies	Deviations from the Purely Competitive Model	Policy Requirements
1. Infant industry argument	Sunk costs, economies of scale and increasing returns	Support ends when industry matures
2. Market complementary – Setting up new industries	Sunk costs, economies of scale and oligopoly Information failures Externalities and complementarities	Adequate government information and competency Socialization of risk
3. Market enhancing	Information failures Coordination problem	Government support to private sector solutions of information and coordination problems
4. Strategic trade theory	Oligopolistic industries and market power Strategic competition	Theoretical effects only – policy relevance widely doubted
5. New growth models	Economies of scale and scope, increasing returns Incomplete markets Information asymmetry Coordination problem Market power - oligopoly	Theories show the possibility of diverse economic outcomes in the context of complex growth dynamics of individual economies
6. The development state – Governing the market	Pervasive deviations from purely competitive market, with special implications for development process	A strong unified and highly competent state

With the passage of time, it is believed that the scale of production will gradually expand, so that firms will be able to reap the benefits of economies of scale. That means that when output expands cost per unit will fall gradually. As the industries progress they learn through their past experience. Through the benefits that can be achieved through learning-by-doing and economies of scale, coupled with the support of government, it is further expected that these infant industries will be able to become internationally competitive (Itoh et al. 1991; Meier 1987).

In order for this argument to be theoretically defensible two conditions must be satisfied. First, when the industry is protected and matures, making use of the benefits of dynamic scale economies, the private firms in the industry must be able to make a profit. In other words, the industry must reach international competitiveness after a period of time. This condition is known as Mill criterion. However, the likelihood of achieving international competitiveness is not a sufficient condition for choosing an industry to develop, because fulfilling such a criteria does not necessarily mean that it has provided net benefits to the domestic economy. Therefore, secondly, the discounted present value of the future social benefits from the industry must exceed those of the costs during the period of government support. This criterion is known as Bastable criterion (Itoh et al. 1991, p. 43; Alavi 1996, p. 102).

A renewed interest in this infant industry argument became evident during the 1950s. At that time, it was widely believed that primary exports receive low prices and have low income elasticities. Most of the developing countries were thus seen to be in a disadvantageous position, due to the fact that most of their world exports consisted of such primary products. To overcome the adverse repercussions arising from this situation, it was argued that developing countries had to diversify exports and to lower their dependence on primary product exports. In other words, some form of industrialization was considered necessary for these economies. Therefore, a number of development economists, such as Hirschman, Myrdal, Nurkse, Singer and Prebisch, argued that protection should be an integral part of development strategies (Leuedde-Neurath 1986). As a result, a significant number of developing countries began to emphasize an import substitution industrial strategy during this period.

However, there are fundamental differences between these development economists and the neoclassical economists regarding the appropriate tool for infant industry promotion. As noted earlier, neoclassical economists generally advocate across-the-board measures – preferably modest subsidies – which promote comparative advantage. Such measures, they claim, create less harmful effects to the economy, in particular to the price mechanism. Proponents of the infant industry argument agree that those activities corresponding to comparative advantage should be promoted. In addition, however, they also recognise the need to promote other

industries which may not be internationally competitive in the short or medium term for technical or learning-time reasons. The latter view stresses the importance of protection to promote infant industries, noting that industries which possess comparative advantage will require lower levels of assistance than one involving high technical barriers to entry or long learning periods (Leuedde-Neurath 1986).

Counter arguments, however, have been levelled against this infant industry argument, as well as against the industrial strategy – import substitution – primarily based on this doctrine. As the critics argue, policy instruments such as quantitative restrictions, tariffs etc., lead to price distortions greater than those arising from the provision of production subsidies. Besides, a vast array of literature (for instance Meier 1987; Balassa 1980; Krueger 1981) claims that import substitution strategies are excessively costly, impact adversely on industrial development and export promotion and, more generally, that the promotion of industries through protection has limited the rate of development of many countries.

1.3 The Government as Complementary to the Market

The neoclassical orthodoxy, outlined in the Section 1.2, considers that the market is the best method for handling resource allocation. By contrast, some of the new theoretical rationales, for instance the 'development state view', that will be presented below in Section 1.6, draw attention to pervasive market inefficiencies, and contend that government may have the capacity to overcome those market inefficiencies effectively.

It is widely agreed that, in certain circumstances, markets do not perform effectively. Whether government can find solutions when markets fail is also a question which has been subjected to much controversy. Highlighting the importance of the private sector in economic activities, a number of recent studies, including World Development Report 1991,[3] Itoh et al. 1991 and Aoki et al. 1996, argue that

[3] This view, known as the 'market friendly view', suggests that where the market works the government role should be minimum and where markets do not work effectively the government role should be intensified. It is further added that the appropriate role of government is to ensure adequate investments

government should play a complementary role in fostering market outcomes. The special characteristics of this view, which is primarily based on the experience of Japan and other East Asian countries, will be reviewed in the following section under two headings: setting up new industries and the market enhancing view.

1.3.1 Setting up New Industries

Taking into account the distinct characteristics of industrial structure in Japan, and describing how initial set up costs may become a constraint on industrial development, Itoh, Kiyono, Okuno-Fujiwara and Suzumura (1991) argue that government intervention, which helps to socialize risk, enables countries to reap the benefits of trade and also to increase economic welfare. They argue that private incentives alone are often not sufficient to establish an industry, due to imperfect information and to certain other market failures associated with technology. Explaining the importance of economies of scale, the presence of externalities and the way in which industrial set up costs may become a barrier for infant industries, these economists claim that industrial set up costs tend to be more prevalent in: (1) oligopolistic industries characterized by considerable scale economies; (2) industries with a greater number of interrelated sectors; and (3) related industries which are themselves oligopolistically organized such that prices alone cannot relay all the information required (Itoh et al. 1991, p. 70).

This approach has a number of special characteristics which are worth exploring. First of all, this rationale considers industrial policies as policies which are necessary only when market failures prevent the market mechanism from attaining the most desirable resource allocation and income distribution. In this sense, the government role is considered as complementary to, rather than as a substitute for, the market. Acknowledging the fact that there is no assurance that industrial policy intervention will raise economic welfare in the event of market failure, this rationale also emphasizes that the improvement of welfare through government intervention depends on certain conditions, such as government's ability to obtain accurate

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in people, provision of a competitive climate for enterprise, openness to international trade and stable macroeconomic management.

information, its administrative capacity and its ability to foresee the long-term effects of policy initiatives.

The incorporation of the distinctive characteristics of the industrial policies of Japan into their model can be considered as another special feature of this approach. The authors emphasize that Japanese industrial policies have had unique features, in the sense that they not only recognized the importance of assembly industries such as household electronics and automobiles in their efforts towards developing industrial structure, but also made efforts to link with the formation of an ideal industrial structure for the Japanese economy as a whole.

The assembly industries, which are at the core of this approach, are composed of a large number of parts and processes. For these types of industries, large-scale production provides the opportunity to set up a network of specialized firms producing individual parts. As the output of the industry expands, production costs and prices will fall. Consequently, the long run market supply curve for the industries with external economies becomes downward sloping, as the industrial set up costs are spread over an increasing level of production. When industrial set up costs are high, the resulting entry barriers may discourage newcomers. In such circumstances, provided that domestic demand is sufficiently high, this theoretical rationale argues that it is possible to raise the economic welfare of a country through government intervention, either in the form of subsidies or import restrictions, even if these products are at an infant stage of production.

Further they add that industries which involve huge set up costs result in multiple equilibria, with countries either gaining a substantial position in a given industry or playing only a very minor part in it. In such circumstances "the equilibrium that finally emerges depends on factors such as the collective information shared by the participants of the game and the coordination enforced by those outside the game" (Itoh et al. 1991, p. 71). Explaining the difficulty in finding accurate information for the private sector as well as the government, they point out that the information exchanges made possible through deliberation councils or other official committees have been greatly beneficial to firms in the case of Japan.

Moreover, this rationale considers that industrial structure and the structure of international trade is not determined only on the basis of comparative cost principle. Instead, other factors such as which country takes the lead in setting up the industry and other non-economic factors (such as culture and history) determine the pattern of international trade. Claiming that Western theories of economic policies (theory of trade, analyses of subsidies and taxes etc.) have a limited value in bringing out the essence of Japanese industrial policies, these authors consider that it is necessary to formulate a model incorporating the distinct features of Japanese industrial policies.

This model is noteworthy on several respects. Firstly, it claims to illustrate systematically why government intervention is necessary for an economy like Japan and how government intervention contributes to the economy. Secondly, and perhaps most importantly, the contribution of this model is notable because of its presentation of a welfare analysis, which has been overlooked by many other arguments supporting industrial policies.

Due to the novelty of these concepts in the industrial policy literature, it may be worthwhile to review this model in detail. Explaining the way in which the advancement of industrial structure affects the economic welfare of a country, Itoh et al. (1991, p. 82) use multisector Ricardian model to elaborate their arguments. Under this model, it is assumed that the structure of production – the supply side – produces an infinite number of goods, which are indexed by a number n, lying in the interval [0, N] and that labour is the only factor of production. There are two trading countries: the home country (Japan) and a foreign country. The production technology for each of the goods in each country is described by a fixed input requirement coefficient. Thus for producing good n, the model assumes that labour input coefficients a_n and a_n^* are used by the home and foreign country respectively. It is assumed that these labour input coefficients represent all the supply side conditions, including the technological levels and the industrial structure of the two countries.

Under these assumptions, the relative wage rate w/w^*, where w and w^* represent the domestic and foreign wage respectively in terms of the home currency, is

considered as the only endogenous variable in this model. As specified by this model, the pattern of trade under the conditions of perfect competition and free trade is determined as follows:

The home country exports good n if $a_n w \leq a_n^* w^*$

The foreign country exports good n if $a_n w \geq a_n^* w^*$

Given these conditions, the home country exports goods for which a_n^*/a_n is greater than w/w^*, and imports goods for which a_n^*/a_n is smaller than w/w^* (Itoh et al. 1991, p. 83). These conditions are illustrated in Chart 1.1. Accordingly, the forward-falling curve represents the supply-wage curve for a given set of production co-efficients a_n^*/a_n. The curve is forward-falling due to the fact that the goods are indexed such that a_n^*/a_n is a declining function of n. So that as the relative wage of the home country falls for a given set of production co-efficients, the home country will be competitive in more industries. This supply-wage curve further represents the relationship between the trade pattern and relative wage rate w/w^* in the two countries. As illustrated in Chart. 1.1, for instance, if relative wages are given by point A, the commodities indexed by 0 to $\bar{n}$ will be home country exports, and those by $\bar{n}$ to N will be foreign country exports. In this situation, good n is termed as the marginal good.[4]

Presenting the demand side, the model further assumes that both countries have fixed labour endowments. Thus, L and L^*, and wL and w^*L^*, represent labour endowments and income of the home and foreign country respectively. The proportion of expenditure, the most crucial demand variable in this model, spent on a good n in the domestic and foreign country is defined by δn and δn^* respectively. For simplicity, the model assumes that the expenditure proportions are fixed (Cobb-Douglas type utility function). With these specifications, the model requires that the

[4] It is assumed that Japan is in the process of catching up with the foreign country. It has to make decisions out of three goods namely, good 1, good 2, and good 3. Production of good 1 requires simple technology, in which Japan has comparative advantage while for good 3 requires fairly advanced technology, which foreign country possesses comparative advantage. Technology for good 2 lies between that of good 1 and good 3, and both countries are equally competitive for producing good 2. It is expected that Japan produces good 1 and 2 while foreign country produces goods 2 and 3 (Itoh et al. 1991, p. 76).

proportion of income spent on all goods, is equal to (will integrate to) unity (Itoh et al. 1991, p. 84).

The above mentioned condition is presented as:

$$\int_0^N \delta_n \, dn = \int_0^N \delta_n^* \, dn = 1 \tag{1}$$

Under the assumption of balanced trade (the value of home country imports must equal the value of foreign country imports) between the two countries and with the marginal good n representing the boundary between exports and imports, equation (2) is formed as:

$$(\int_{\bar{n}}^N \delta_n \, dn) wL = (\int_0^{\bar{n}} \delta_n^* \, dn) \, w^* L^* \tag{2}$$

In equation (2), the left side gives home country imports, and the right side represents foreign country imports. Rearranging, the equation (2) we get:

$$(wL)/(w^* L^*) = (\int_0^{\bar{n}} \delta_n^* \, dn)/(\int_{\bar{n}}^N \delta_n \, dn) \tag{3}$$

Or, equivalently:

$$w/w^* = [(\int_0^{\bar{n}} \delta_n^* \, dn)/(\int_{\bar{n}}^{\bar{N}} \delta_n \, dn)](L^*/L) \tag{4}$$

The demand-wage relationship illustrated by equation (4) is further demonstrated in Chart 1.1 with an upward-rising curve. This curve emerges from the relationship between the relative wage w/w^* and the trade pattern (given n as the marginal good). This demand-wage curve is always upward-rising, as the model claims "the larger the share of foreign expenditure on the home country goods (or the smaller the share of home country expenditure on imported goods), the higher is the relative wage, w/w^*, and relative income ratio wL/w^*L^* for the home country" (Itoh et al. 1991, p. 84).

Chart 1.1

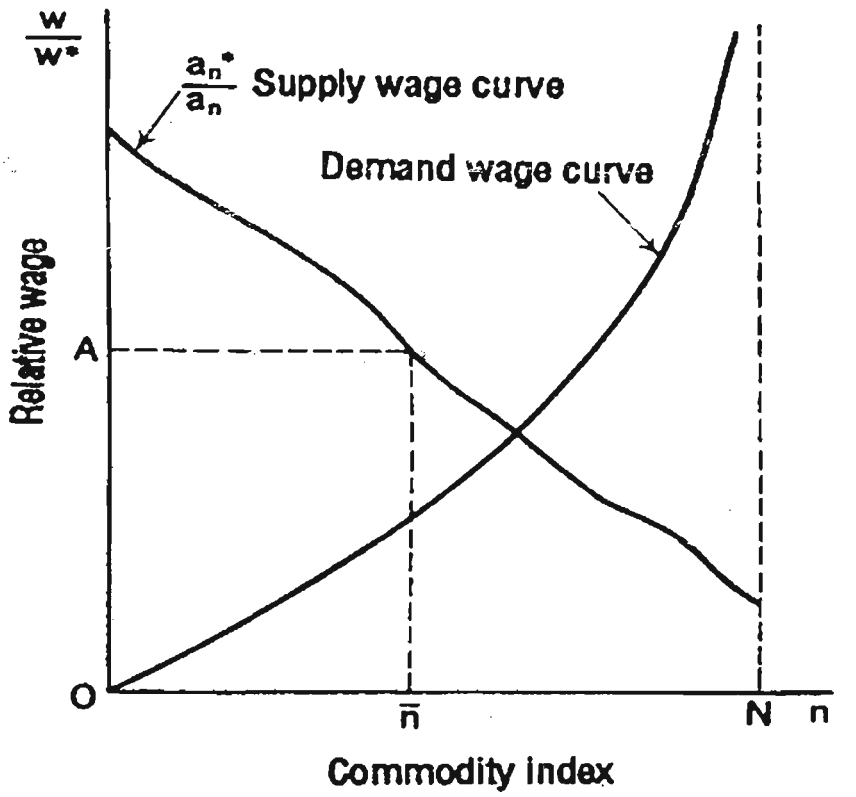
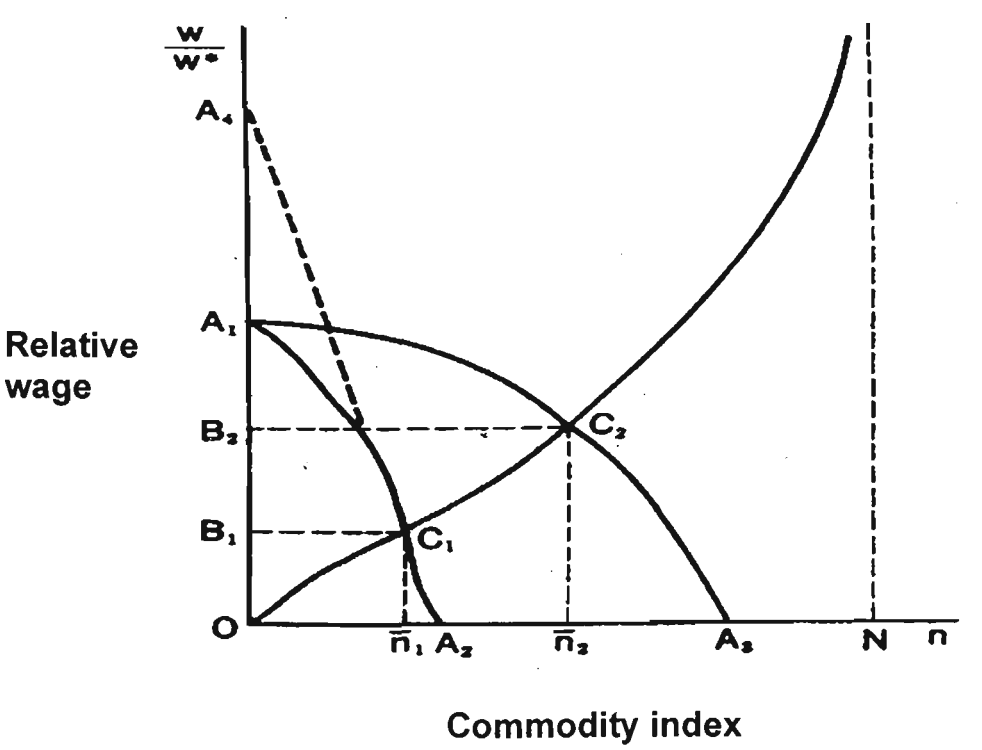


Chart 1.2



Trade equilibrium, as demonstrated in Chart 1.1, occurs for the two countries at the point of intersection of the supply and demand wage curves. In the end, the index of the marginal good n, which represents the trade pattern, and w/w^*, the relative wage, are determined by the technology and industry structure parameters [a_n and a_n^*] and the parameters representing the pattern of demand [δ_n and δ_n^*].

Within the framework specified in the model, it is claimed that the home country relative wage rises when there is diversification of the home country export menu accompanying a rise in the index of marginal good n. In other words, "if diversification of the home country export menu leads to greater demand, derived demand for the home country's factors of production will also rise, pulling up incomes in the home country" (Itoh et al. 1991, p. 85).

How the pattern of trade and gains from trade are determined with this model are further explained by Itoh et al. (1991, p. 85) while introducing the concept of 'technology gap', with the aid of Chart 1.2. The curve, A_1 A_2, represents the supply-wage curve at the initial state of industrial development of the home country. At this stage the relative wage of the home country is extremely low (OB_1) and it produces an only a small number of industries. If home country establishes a number of industries, which enable it to diversify its industrial structure, it is possible to shift the supply-wage curve A_1 A_3.With the shift of the supply-wage curve, for a given demand-wage curve, now the equilibrium occurs at C_2. "As a result the goods indexed by interval [$\bar{n}_1$ to $\bar{n}_2$] are added to the home country export menu, and home country relative income (relative wages and wage levels in the home country's currency) rises by the amount of expenditure on these goods in line with the demand-wage schedule" (Itoh et al. 1991, p. 86).

Itoh et al. (1991) also claim that there exist other theoretically possible patterns of industrial development.[5] For instance as a result of R&D or equipment investment

[5] Another alternative theoretical outcome could emerge with the reaction of the foreign country. If foreign country react in a different way such as taking actions to reduce the technology gap, the home country is affected either positively or negatively depending on the degree to which the shift in

in industries where the home country (Japan) held a comparative advantage, the supply wage curve may shift from A_1 A_2 to A_4 A_2 The equilibrium in this case occurs at C_1, and the structure of comparative advantage or the relative wage will hardly change. This is a case in which policy leads the home country to become more efficient in existing industries (to be competitive at a higher wage) but not to enter production in additional industries.

All in all, Itoh et al. claim that the industrial development accompanied by diversification of the home country export menu, may be beneficial to the home country in several ways than other theoretical possibilities noted above. Because it raises the relative wage in the home country, it generates benefits in the form of lowering the cost of consuming the goods produced by the newly developed industries, and increases in income allow imports of more goods. Further, "if industrial development centers around marginal industries with high expenditure shares, the chances that the home country's relative income rises sharply and the foreign country bears losses are greater" (Itoh et al. 1991, p. 87).

With the aid of the model presented above, Itoh et al. (1991) then analyse how the changes in the Japanese industrial structure could contribute to increased economic welfare. They argue that the industrial structure of Japan can change in two different ways: either specializing on good 1 where they have comparative advantage or specialising the marginal industry (good 2). Accordingly, if the Japanese industrial sector specializes in good 1, the resulting competitive advantage would unlikely enhance the economic welfare. Because, the price elasticity of demand for technologically simple goods are in general tend to be low. In such a case, even if the prices of these goods fall due to the specialistion, foreign demand for these goods is unlikely to rise. If the proportion of expenditure spent on these products from a foreign country remains unchanged, one cannot expect substantial changes (increase) in relative income in the home country.

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technological coefficient a_n is concentrated in the marginal industries and the share of these marginal industries in total demand.

By contrast, if Japanese industrial development is based on increasing competitiveness in the marginal industry (good 2) this may lead to substantially different welfare effects. When Japan specialises in good 2, the supply source (for a part of this good) shifts from the foreign to the home country. Japanese exports of this product will increase, while exports of good 2 will contract in the foreign country. Since Japan is able to replace part of these goods, that was originally obtained from the foreign country, the amount Japan spent on importing (the proportion of expenditure) will be reduced relative to that of the foreign country. If foreign country continues importing these goods then there will be substantial differences in relative income in these two countries. As we noted earlier, structural changes in favour of good 2 is beneficial to the home country because it raises the relative wage in the home country, generates benefits in the form of lowering the cost of consuming the goods produced by the newly developed industries, and increases in income allow imports of more goods. These favourable effects are more likely to be materialised if the price elasticity for good 2 is greater than 1. In such a case, a fall in price will lead to an increase in the share of expenditure allocated for this good by the foreign country, raising the relative income of Japan. However, Itoh et al. express their doubts regarding the effects of economic welfare of the foreign country. In response to these changes foreign countries may either retaliate by imposing trade restrictions or provide production subsidies. Such actions may provoke further retaliations from Japan thus resulting the contract of world trade. Foreign country can however react in a different way that is by promoting development of advanced industry.

This theoretical rationale stresses that countries could achieve substantial benefits if industries which require huge initial investments but initially possess less comparative advantage, are supported by the government. It also notes that import controls can also be used as a device for export promotion if the domestic market is large enough. Since it is impossible to treat all the infant industries equitably for promotion for a developing country which faces resource constraints, Itoh et al. argue that it is necessary to set up priorities and promote certain industries. Promoting industries which possess high income elasticities would be beneficial since it will raise the relative income of the home country.

1.3.2 Market Enhancing View

As outlined previously, it is often held that neither the market nor the government alone can handle economic activities effectively and efficiently. Highlighting the practical limitations of both the neoclassical orthodoxy and the development state view, therefore, an argument described as its authors as the 'market enhancing view' contends that the role of the market as well as that of the government is necessary for the effective and efficient operation of economic activities.

Introducing this view, Aoki, Murdock and Okuno-Fujiwara (1996), state that market failure can be more pervasive than the market friendly view tends to suggest, but that this does not unconditionally justify the immediate substitution of state led coordination. They argue that neither the market nor the government alone can adequately handle market imperfections. In their words "government is not a neutral, omnipotent agent that can correct market or organization failures. Government itself is constrained in its capacity to process information" (Aoki et al. 1996, p. 1). Governments may also face the same informational and incentive constraints as other economic agents in the system. Therefore, the effectiveness of government in promoting the efficiency of private coordination cannot be taken for granted.

Instead of viewing the government and the market as the only alternatives and as mutually exclusive substitutes, this 'market enhancing view' considers that government should play a role which facilitates or complements private sector coordination. They assert that private sector institutions have comparative advantages, while the government has the ability to process locally available information. Like others, they agree that private sector institutions do not solve all important market imperfections and that this is particularly true for economies in a low state of development. Since the private sector has built-in self-regulating features such as competition, entry and exit that the government does not have, this view considers that it is advisable to allow private sector institutions to solve coordination problems whenever possible. In that respect, policy intervention should be limited to solving coordination problems depending on the level of development of the country. Like the 'development state view', Aoki et al. (1996) contend that when an economy

is in a low state of development, the ability of the private sector to solve challenging coordination problems may be inadequate. In such economies the availability of intermediaries is limited, the capabilities of firms are modest, and the efficiency of markets is hampered by poor integration. Under these circumstances, there may be more scope for government policy to facilitate development. "From this perspective, it is not the government's responsibility to solve the coordination problem. Rather, the government's role is to facilitate the development of private sector institutions that can overcome these failures" (Aoki et al. 1996, p. 9).

In essence, the ideas expressed by this market enhancing view, like the other theoretical rationale presented in this section (Itoh et al. 1991), seem to be more practical since they take into account the actual experience of Japan and other East Asian countries. Lack of formal analysis may, however, be regarded as one of the limitations of this contribution. Moreover, though they recognize the significance of both private and government roles, they have not specified the ways in which government can help to foster the private sector.

1.4 The Government as a Strategic Player: Strategic Trade Theory

Since the early 1980s, a considerable body of literature has stressed the importance of selective government intervention in promoting industrial development. Much of this literature highlights the supposed fact that, due to certain market failures arising from the structural rigidities of developing countries or from imperfectly competitive market conditions, industrial development in certain industries will be slow if left to the market forces alone. In the literature which emphasizes the importance of selective government intervention, two approaches are most notable. They are 'strategic trade theory' and the 'development state view'.

Contrary to the theoretical rationales presented in section 1.2, 'strategic trade theory' argues that a country that promotes industries characterised by economies of scale and externalities can help to shift its pattern of comparative advantage, and can thereby promote economic growth. This rationale, initially introduced by Brander and Spencer (1981) and later extended by Krugman (1984, 1986, 1987), is based, like

other approaches, on the presence of externalities, imperfect markets and economies of scale. However, there exist certain differences in presenting their arguments in support of industry specific intervention. More specifically, this new rationale, formulating a model in an imperfectly competitive environment – an oligopolistic competitive model with a domestic and a foreign firm, where competition occurs through prices (the Cournot model) – explains the way in which strategic interactions can give rise to the possibility of beneficial policy.

In a perfectly competitive world, prices are determined by the market, and the earnings of equivalent factors in different sectors are equalised through competition over time. In the case of an imperfect competition, where there are a small number of producers in the market, producers can influence prices. If they set prices above the marginal cost there will be excess profits. Under competitive markets, these excess profits will attract new firms, and will continue to do so until the excess profits disappear. A similar process may not happen if the market is imperfectly competitive. The existing entry barriers, either based on the requirement of large-scale investment, or on the presence of economies of scale, prevent newcomers entering into the market. Consequently, the equalisation of factor and product prices may not necessarily occur in this type of market.

Presenting their theoretical model in a similar fashion, the authors assume that, in some goods and services markets, there are relatively few firms engaged in production. As a consequence, it is possible for firms to earn profits above the rate of return earned in purely competitive industries. For instance, as Krugman (1986, p. 15) notes, trading patterns are now more likely to be influenced by the important role being played by economies of scale and the advantages of experience and innovation. In particular, due to the increased role of technological competition, labour or capital will sometimes earn significantly higher returns in some industries than others.

By incorporating a Cournot model in which competition between one domestic firm and one foreign firm occurs through setting prices, strategic trade theory argues that the profits of each firm depend on strategic interaction with the rival firm. The model then shows that if the lower cost firm expands its output, the rival will contract.

By identifying certain types of strategic sectors which are facing foreign competition, and imposing trade policies so as to increase domestic participation in these industries, it is thus possible that countries will be able to reap the benefits of economies of scale. Government intervention, in such circumstances, benefits the country in a number of ways. Government policies enable it to secure for the nation a large share of the rent implicit in the oligopolistic competition. In particular, with the help of appropriate policies it is possible to shift the profits from oligopolistic foreign firms to domestic firms, thus improving the profitability of the latter. This is possible, as Spencer (1986) argues, because government policies that increase domestic capacity are likely to serve as a signal to foreign firms, indicating that there will be threats in the future to the returns they can earn in the industry. These signals in turn might have the effect of reducing the foreign firm's capacity, even if they had been expecting to expand their production further.

The likely procedure, as explained by Brander, is as follows:

> When one firm expands output supported by a credible threat, the other firm has no reason to believe the increased competitiveness is only temporary. The best it can do is respond to the lowered leftover demand that it sees by reducing output. This in turn helps the lower cost firm. In effect this firm benefited twice from lower cost. In the first instance, it simply gained directly because costs fell. In addition the lowered costs improved its strategic position in the market and indirectly induced the rival to contract. This contraction by the rival increases the price that the expanding firm can obtain for any given output level and causes profit to rise through that channel. Thus the firm with lowered costs benefits by more than the amount of cost saving. (1986, p. 28)

Through government policies it may also be possible to reduce the extent of spillovers of domestic R&D to foreign firms. If there is oligopolistic rivalry between foreign and domestic firms, as Spencer (1986) notes, any spillover of domestic R&D to the foreign firms is likely to reduce the rents earned by domestic firms in international markets. In those industries where there are major problems from appropriation of returns from R&D, it is argued that by providing incentives it is possible to maintain the required level of R&D.

Explaining further the ways in which government policies are influential to the domestic economy, 'strategic trade theory' contends that, by systematically promoting those industries in which economies of scale and externalities are present, countries

are able to overcome entry barriers, reap the benefits of economies of scale and enhance productivity. In effect, firms as well as an economy will be better off if the domestic firm is able to lower its costs through more efficient methods of production. These economists argue that, through export subsidy or production subsidy, it is possible to create similar effects to a lowering costs. A subsidy to the cost of producing extra output makes it in the firm's interest to expand output. The expansion of output then leads to a lowering of marginal cost sufficient to create domestic advantage, where otherwise it might not have existed. In effect, the subsidy makes it possible for the domestic firm to stake out a larger market share of a profitable international market than it otherwise could. Providing subsidies to all industries, they argue, would not be effective and therefore they stress the importance of 'picking winners', though they themselves admit it as a difficult task. Further they point out that protective policies can be also used as a source of export promotion. For instance, Krugman (1984) and Brander (1986), introducing a strategic interpretation to the infant industry argument, suggest that restricting a particular market or subset of a market to domestic producers will help them to reap the benefits of economies of scale.

1.5 Development Policy and Some New Growth Models

The theoretical approaches to industrial policy presented above highlight a variety of ways in which actual markets may perform less effectively than the purely competitive paradigm implies, and this raises the possibility that government intervention is necessary to achieve certain economic goals. In a similar vein, many 'new growth theories' suggest ways in which economic growth could possibly be lower than the social optimum under competitive markets, again raising the possibility of policy intervention.

Following the lead of Arrow's seminal 1962 paper on learning-by-doing, Romer (1986) introduced new growth theory, or endogenous growth theory, by developing a growth model with externalities in the production function. Lucas (1988), in another seminal paper in the development of the new growth models, introduced another parallel model with externalities in the learning process. The

theoretical insights provided by these models have inspired the development of a wide range of new growth models based on a variety of assumptions. A quite extensive analysis of these new growth models can be found in Romer (1990, 1994a), Barros (1993), Grossman and Helpman (1991a), Sheehan (1993, 2000), Pack (1994), Verspagen (1992), Hammond and Rodriguez-Clare (1993), Barro and Sala-I-Martin (1995) and Lucas (1999). Relaxing some specific assumptions of neoclassical theory, these new growth models provide diverse policy implications in relation to growth, trade and investment while still operating broadly within a neoclassical framework.

Due to the extensive and diverse nature of the new growth literature, presenting the specific contribution of even a reasonable selection of the new growth literature is far beyond the scope of this chapter. Instead, this section will review briefly aspects of the way in which some of these models depart from the basic neoclassical view of growth, emphasising ways which might be seen to provide a rationale for industrial policies.

1.5.1 Basic Characteristics

Prior to the introduction of these new growth theories, the prevailing neoclassical theory of economic growth (the Solow/Swan model) was one in which per capita growth was determined by technological change, which was assumed to be exogenous. Though it is widely accepted that the role of technological change is important in determining economic growth, the mechanism by which it influences economic growth remains unspecified in the Solow/Swan model. Other than labelling the residual – that element of economic growth which was left unexplained after accounting for the contribution of growth in factor supplies – as technical progress, this model had little to say about policies that might significantly influence long run growth.

Thus one central motivation for the development of new growth theories was to show how endogenous technological change might drive growth. These new models continue, in most cases, to use neoclassical approaches such as a general equilibrium framework and the assumption that a representative economic agent

optimises his or her welfare over an infinite horizon. In many instances, these models involve two capital goods, one good representing physical capital, which is also a substitute for consumption, and another good which has various interpretations from one model to the other, representing human capital, production designs, intermediate goods facilitating the production of differentiated products and so on. Thus, contrary to the neoclassical model, which assumes that economic goods are both rival and excludable, some of these new models consider a set of goods some of which are non-rival yet excludable, such as production designs (Romer 1990). Indeed, Romer (1994a) has argued that most important new element in the new growth theory lies in the relaxation of the standard assumption that the set of goods is fixed, and hence the modelling of the endogenous creation of new goods.

In this framework these models variously illustrate how steady state growth can be endogenously generated within the economy by learning-by-doing, by the creation and use of new products or new process technologies, by the creation and use of human capital development and so on. These theories thus not only provide an explanation as to how economic growth may be endogenously determined but also illustrate some mechanisms by which such factors can generate sustained economic growth. Nevertheless, it must be emphasized that new growth theory remains formally within the neoclassical tradition, and continue to make most of the assumptions and characteristics of that tradition.

In explaining the possibility of continuous endogenous growth, most of these new models make use of increasing returns.[6] Thus in most of these models the marginal product of capital is bounded away from zero. A necessary condition for continuing endogenous growth in the representative agent model is that the marginal product of capital (or more generally of the factors which can be accumulated) remains constant at some level sufficient to preserve the incentive to invest. In a standard neoclassical framework, endogenous growth must eventually cease at some point in time, because diminishing marginal returns to capital means that at some point the returns to investment no longer exceed to costs of capital.

[6] However, some models of endogenous growth, for instance Jones and Manuelli (1990) show that increasing returns are neither necessary nor sufficient for endogenous growth.

Economists have recognized the presence of increasing returns, and their significance, for quite some time. Because of the technical difficulties, incorporating increasing returns to a formal model has been difficult. Overcoming these difficulties to a certain extent, mainly by using advances in the mathematical analysis of dynamic optimisation problems, Romer (1986) and subsequent new growth models apply various strategies to handle these increasing returns in a modelling context. Basically, two approaches are applied in these models. One is to treat increasing returns as externalities. Accordingly, increasing returns are external to the firm but internal to the industry. Under these conditions, the decision-making process of a firm can be handled within a competitive market framework. The more fundamental approach applied in new growth theory is to treat increasing returns as arising in the context of monopolistic competition, using the formalization of monopolistic competition developed by Dixit and Stiglitz (1977).

1.5.2 Variety of Models

Incorporating the above noted basic characteristics, a wide variety of models have been developed to interpret endogenous growth. These models have been categorised in the literature in a number of ways (Hammond and Rodriguez-Clare 1993; Barro and Sala-I-Martin 1995; Lucas 1999). For instance, these endogenous growth models have been categorized by Barro and Sala-I-Martin (1995) as one-sector models and two sector models, and others have used the basis of technological change, such as models with an expanding variety of products and an increasing diversity of quality of products. However, in this section, following Sheehan (1993, 2000), endogenous growth models will be discussed briefly under three main categories related to their approach to increasing returns.

Firstly, there are models that generate endogenous growth with constant returns to scale, and do not require increasing returns to scale. In these types of models all the factors used in producing output can be accumulated. In this framework, with one factor of production, the model due to Rebelo (1991) shows how steady state growth emerges. In these models there is a constant return to the

accumulated single factor of production, so that the marginal return does not fall and growth continues over time.

Secondly, there exist many new growth models that are centred around the concept of externalities. For instance, introducing his first model Romer (1986) pointed out that investment in new knowledge may create externalities. The creation of new knowledge by one firm is assumed to have positive external effects on the production possibilities of other firms, because knowledge cannot be perfectly patented or kept secret. Following Arrow's paper of (1962), Romer (1986) assumed that the output of the representative firm is a function of both the firm specific capital stock, labour inputs and of the aggregate capital stock in the economy. Further he assumed that new knowledge is a product of research technology that exhibits diminishing returns. The key idea behind this model is that it is possible that all agents face a convex production function, yet at the same time there is a non-convexity in the aggregate production function of the economy. Using three elements – externalities, increasing returns in the production of output and decreasing returns in the production of new knowledge – Romer then illustrates how steady state growth is obtained. However, this equilibrium is not Pareto optimal, and government policy may generate an improved social outcome. Likewise one can find variety of models, for instance (Lucas 1988; Barro 1990) that are primarily based on the presence of externalities.

Thirdly, there are many other models which have emphasized the generation of endogenous growth in the context of monopolistic competition. Romer (1987, 1990), initiating these models, identifies two components of knowledge: human capital, which is rival, and technological knowledge, which is non-rival. As he notes, this non-rival characteristic of the latter has two important implications for the theory of growth. First, non-rival goods can be accumulated without bound. Second, treating knowledge as a non-rival good makes it possible to talk sensibly about knowledge spillovers, that is incomplete appropriability of the benefits arising from knowledge (Romer 1990, p. 75).

The Romer (1990) model has three sectors: the research sector, which produces new knowledge; the intermediate-goods sector, which uses the designs from the research sector and is assumed to be monopolistic with increasing returns; and a final good sector, which uses labour, human capital and the set of producer durables that are available to produce final output, and is assumed to show constant returns to scale.

According to this model knowledge enters into production in two ways. Firstly, new designs enable the production of a new good that can be used to produce output. Secondly, these new designs increase the total stock of knowledge and thereby increase the productivity of human capital in the research sector (Romer 1990, p. 84). Despite the presence of the externality, this model claims that private agents, in particular the research sector, will invest in research because of the returns available from the application of designs to production.

Like previous models, this model shows how a balanced growth equilibrium can be derived in competitive conditions. In the steady state, it is expected that consumption and the capital stock grow at a single constant rate equal to the rate of growth of the stock of designs. This model thus shows that growth occurs at a rate equal to the rate of endogenous innovation. However, in this model the social optimum rate of growth is higher than that generated by the market alone. Hence there is again a possible role for policy.

Many other models that have emphasized endogenous growth under monopolistic competition can be found in the literature. For instance, Grossman and Helpman (1989, 1991a) have introduced variety of models. Some of these models use improvements in product quality and others use improvements in product variety, and the basic model has been extended to explore endogenous growth in the context of international trade.

1.5.3 Some Implications of New Growth Theory

Despite the presence of a variety of models which are in turn based on diverse assumptions, these new growth models overall emphasize the presence of externalities and increasing returns, and show how endogenous growth can arise in large part because of intentional actions taken by economic agents who respond to market incentives. However, in most of these models the equilibrium growth rate under pure market conditions is lower than the optimal growth rate. As a result, they imply that government policies such as subsidies to R&D, to investment or to human capital, can increase the equilibrium growth rate, up to the level of the optimal growth rate. In other words, the emergence of new growth models, stressing the role in growth of economies of scale, human capital accumulation, increasing returns and endogenous technological progress has brought new elements into the analysis of the ways in which trade, industry and other national policies affect long run economic growth.

Several aspects of the contribution of new growth theories are noteworthy. First of all, they provide some new insights into the understanding of the mechanisms of development economics and growth theory. Under its assumed conditions – primarily the diminishing marginal productivity of capital – earlier neoclassical theories predicted that the income levels of different countries, and ultimately the growth rates, should converge in the long run. Contrary to these expectations, there appears to be persisting inequality in incomes between countries. Explaining the possible reasons for such continuing diversity in per capita GDP levels, some new growth theories claim that it is possible to have sustained differences in both levels of, and rates of growth of, national income (Pack 1994). As Barros (1993) notes, the inclusion of increasing returns in the production function, and the differences that arise between the optimal and equilibrium paths, have exposed a new horizon for the assessment of development policies and strategies by these new growth models.

Krugman (1992) has pointed out that the significance of external economies and strategic complementarities, and their influence on economic development, had been discussed extensively by a number of development economists in the 1950s, such as Rosenstein-Rodan and Hirschman. He suggests that their ideas were not

carried further in economic analysis partly because the founders of development economics failed to make their points with sufficient analytical clarity and with formal models. In that respect, it is considered that these new growth theories have provided a step forward in developing a common framework which can bring together development economics and growth theory. As Sheehan notes:

> many of the models thus envisage a potential role for policy much more in line with various development programs than with traditional economic theory, such as the encouragement of leading sectors by policy action or the co-ordinated expansion of a number of sectors in a big push for growth. But the value of the modelling lies not in the recommendation of any given policy, but in providing a setting in which the conditions for the success of any such strategy can be explored. (1993, p. 59)

In addition, these new growth models are also valuable since they allow the possibility of analysing the role of trade and other national policies affecting growth. For several decades, for instance, international trade theory highlighted the fact that there are gains from trade. However, the mechanisms by which trade affects economic growth was not clear, since the standard theories were built up completely independently of national policies. New growth models, as many economists note (Edwards 1993; Hammond and Rodriguez-Clare 1993), not only provide logical explanations but also extend the possibility of empirical investigations in many policy related areas, such as trade, technology and innovation.

Apart from providing logical explanations and introducing a variety of models, mechanisms and linkages driving growth, these new growth models have widened the potential policy combinations that can be considered to boost growth. Economies may vary from one to another, depending on their resource endowment, political economy, status of development, technology and so on. With these differences there emerge a wide variety of factors which may influence the growth mechanism. In this respect, the intuitions presented by the variety of new growth models are of significance, because they provide insights with which to explore the complex growth dynamics of individual economies. More importantly, the variety of new growth models suggest that relevant mechanisms may vary greatly from country to country, given variations in initial conditions, technology and firm structure, expectations and ambitions and so on (Sheehan 1993).

1.6 The Development State

Another strand of the literature has begun from a detailed analysis of the strategies, institutions and successes of various East Asian countries, and has developed a supportive view of the role of industrial policy. This approach has been identified under various terms – 'structuralist', 'revisionist', 'statist', 'new political economy', and 'development state', and the latter term will be used here. The starting point of this approach was Johnson's (1982) seminal account of the role of MITI in Japan's post-war industrialisation. Other important studies include Amsden 1989; Wade 1988, 1990a, 1990b; Leuedde-Neurath 1986 and Chang 1994.

This approach, while challenging neoclassical orthodoxy in the context of developing countries and taking the outstanding economic success of countries such as Japan, Korea and Taiwan as evidence, argues that governments can have a significant effect by intervening aggressively to develop industrial sectors, particularly the capital and knowledge intensive sectors, thereby enhancing export opportunities and growth.

As Wade (1988), one of the pioneers of this view, notes, governments with a powerful set of policy instruments and effective coordination have developed the capacity to guide economic activities effectively – notably the rapid restructuring of the economy towards higher technology production. Expressing a similar view, Amsden (1989) states that government in developing Asian countries was not only involved in resource allocation but also deliberately distorted the price structure by use of subsidies, protection, price controls and restrictions on finance and investments. She argues that the key East Asian countries differ from other developing countries which adopted such measures in that, to prevent potential negative effects of those distortions, they imposed performance standards on private firms so as to reward winners and punish losers.

Under this line of argument, the broad rationale for government intervention in industrial development again lies in the perceived inadequacy of market outcomes, especially in developing countries. Due to the various characteristics discussed above

– externalities, increasing returns with entry barriers and decreasing marginal costs, failures in information and in the mobility characteristics of factors – the actual economy departs significantly from the perfectly competitive model assumed by the conventional theories. Therefore, this rationale strongly supports government intervention in particular industry specific sectors, in order to overcome market failures. However, instead of producing a formal theory, these authors justify their approach by highlighting several aspects of the structural characteristics of developing countries.

Firstly, this rationale points out why relying on market mechanisms may not be a suitable option for developing countries for their industrial development. If left to market forces, or if countries rely on comparative advantage, these countries may be more inclined to stick within a narrow range of familiar product lines rather than branch into new industries and products. Thus their pace of economic development may be slower than that of countries which concentrate on emerging products. Stressing the significance of technology development, this new rationale further adds that in many industries competitive advantage seems to be determined neither by underlying national characteristics nor by the static advantages of large-scale production, but rather by the knowledge generated by firms through R&D and experience. As Wade (1988, p. 153) notes, national comparative advantage is not simply the result of a given endowment of capital, labour and natural resources, but is also the result of government promotion. Some sectors and products are more important to a country's growth prospects than others, he argues, mainly due to the presence of externalities.

Government intervention at an early stage is recommended by these advocates, so as to induce economic agents to shift from a short to a longer term investment horizon and thereby to speed the process of industrialization. If domestic producers are given assistance to enable them to compete successfully against foreign suppliers in the domestic market, despite higher costs, it is asserted that they may be able to expand their production. With large-scale production, it is expected that firms will be able to price exports at below current average costs and thereby gain market share against foreign rivals. This process could in turn lead to a rapid shift in the industrial

structure. When the international productivity frontier is advancing rapidly, as in the case of electronics, the time needed for an infant industry to catch up may be long and the amount of assistance required may be large. To reap the maximum benefits from the support provided, government assistance on a selective basis rather than in the form of across-the-board assistance is advocated. Introducing his 'governing the market' approach, Wade stresses that:

> given a world of technical change, falling cost curves and differential rates of growth across industries, it can be rational for a government to select from within the plausible industries those which have high growth potential and to use the powers of government to supplement those of the market in marshalling resources for entry and successful participation. (1990b, p. 355)

Secondly, stressing the sub-optimal investment in industries that involve high initial costs, the proponents of this view argue that government intervention is required for developing capital and knowledge intensive industries in these countries. As they point out, firms are reluctant to invest in the type of industries that involve high initial costs, since they involve high risks and a large commitment of time. Externalities and the resulting lower private returns that can be captured by the investor are also cited as reasons for sub-optimal investment in these types of industries. Externalities may take the form of benefits created by a firm, in the form of goods, services or technological capacity. For instance, the production activities of one firm generates experience and tacit knowledge which is useful to other firms. Alternatively, the results of one firm's research and development can be used by other firms to improve their own technology. Though capturing all the benefits may not be possible for the investing firm, other firms within the industry, as well as the firms in other industries within the national economy, may be able to reap some of those benefits. Underdeveloped capital markets may also be a barrier, in the case of developing countries, to stimulating investment in industries that require high initial set up costs. Nevertheless, it is believed that investment in these types of industries could be promoted through government coordination of investment decisions or through providing incentives for additional investment. Thus, in cases where technology and industrial investments are sub-optimal, for this reason the development state view considers that tax incentives may be used to increase private rates of return on investment. In cases where the scale of investment required is beyond national private firms, government coordination of public and private

technology development activities is advocated (Wade 1988, 1990a, 1990b; Helleiner 1992; Stern 1990).

Thirdly, these economists stress the importance of the coordination of economic activities, especially in the context of developing countries. It is argued that in many cases a firm's potential gains from an investment are contingent upon complementary decisions by other firms. For example, the production decisions of a large upstream plant may depend upon the decisions of several other downstream firms, and vice versa. Hence they stress the importance of government intermediation in activities where simultaneous externalities (complementarities) occur. A government role at this stage, as they argue, is required since information may not be fully share and private decisions will not take account of all social benefits. Further, they add that by selecting industries which have potential linkages with other industries, countries are able to reap the benefits of positive spillovers (Wade 1988, 1990b, 1994; Stern 1990; Pack and Westphal 1986).

As is clear, the previous discussion suggests that, to develop capital and knowledge intensive industries in developing countries, government intervention is an alternative option. In other words, these authors consider that governments can overcome market failures and efficiently improve economic activities. More importantly, taking certain distinguished characteristics of the Japanese economy such as long-term vision, efficient bureaucracy, appropriate institutions, administrative guidance etc. as an example, they emphasized that government could play an influential role in industrial development. Further, they claim that the potential harmful effects of government intervention, such as rent seeking, can be controlled when government intervention is based on well-specified and effectively enforced rules. Government coordination failures can be minimized when the number of players involved is small, the homogeneity of products is high and the channels that permit information exchange between the government and the private sector function effectively (Kim and Ma 1996).

As previously mentioned by Matsuyama (1996), there may be situations where government with its coercive power can handle coordination failures successfully, but

this does not necessarily mean that government can efficiently handle all the situations. For example, coordination failure, a point often highlighted in the literature calling for government intervention, requires very detailed information on, among other things, market conditions and the relationships among various private agents and activities. Such information is not likely to be available to the government and it may therefore not be able make the best judgement. If this is the case government may also fail to perform the coordination of economic activities any more effectively than the market mechanism.

Further, the government decision making process may be constrained by the political economy of its institutions and interactions with the private sector. Some parts of the state may express independent preferences while others, often the larger parts, may reflect different societal interests. No state is completely autonomous from the pressures of societal interests (Lim 1998; Aoki et al. 1996). Moreover, correcting market failure through government intervention may lead to economic mismanagement. This is because government intervention creates artificial returns that may be captured through 'unproductive' rent seeking activities by private interest groups (Helleiner 1992). Above all, the policy makers may know little about scale economies, externalities and the prospects of learning in particular industries, and in that respect market forces may be better at picking winners (Alavi 1996).

Furthermore, as Okuno-Fujiwara (1996) and Lim (1998) note the 'development state view' seems conjectural. It expresses the author's beliefs without providing an analytical framework. Moreover, they try to substantiate their arguments in terms of narrow objectives like how to enhance export opportunities, industrial and economic growth, while ignoring other overall effects such as consumer welfare and price distortions.

1.7 Theory, Diversity and Empirical Assessments

In essence, what all these theoretical approaches suggest is that the market alone may not provide efficient and effective outcomes for all the economic activities. Though there are certain differences when presenting their arguments, as can be seen from

Table 1.1, in general all agree that in situation where externalities, entry barriers, economies of scale and scope, information asymmetries and so forth are present, markets may perform at a sub-optimal level. In such situations it is believed that policies could play an influential role in improving the outcomes.

However, there exist different views regarding the role of government among these approaches. For instance some consider that government should play a minor role. Some others consider that, due to certain factors such as resource constraints, structural rigidities, and certain peculiar characteristics of some industrial sectors such as high growth potential, rapid technology development, entry barriers and economies of scale, policy intervention should be sector or industry specific.[7]

It is important to note that, like markets, no policy or set of policies, no matter how good, can work for all countries and at all times. In other words, there may be situations where government failures could occur. Further, the outcome of policies, as many economists point out (for instance Lau 1996; Kwon 1994), will depend on diverse factors such as resource endowment, level of development, technology, external conditions, the potential size of the domestic market, the initial size distribution of the enterprises, and the structure of political institutions. These factors further influence the suitability and the effectiveness of government policies, and also the choice of appropriate policies.

Theoretical models certainly provide guides to the possible economic implications of markets and/or policy intervention. Yet these models are built on assumptions chosen for their simplicity. In empirical work, however, we face more diverse and complex economic situations – many different types of market failure and a variety of policy instruments that have used to address these failures – than assumed by the theoretical models. Hence empirical judgements may sometimes be different from the conclusions of theoretical models. For example, as some theoretical rationales argue, it is true that developing countries can benefit through promoting

[7] It is important to note that some approaches (development state view and strategic trade theory) have emphasized the importance of policy intervention without specifying overall social implications. For instance Wade (1990b, p. 350) states that the objective of policy intervention is not efficient allocation of resources in a Pareto optimum sense but growth and innovation.

capital and knowledge intensive products. However, government intervention is itself not sufficient to the long-term survival of these industries. To maintain competitiveness these industries require up to date technology, skilled manpower and huge R&D investment. In the absence of these factors, government intervention would provide little benefits to the economy. This is the situation that countries such as Korea and Taiwan are now facing. In their early stages of their technology development they can depend on developed countries. These latecomer firms build up relationships with foreign manufactures and buyers, in their search for technology and access to markets. However, now these firms are facing an increasingly complex, sometimes hostile, international technology and market environment (Hobday 1995, p. 4).

Moreover, evaluating the impact of policy intervention is not so simple as it seems. On the one hand government rarely uses clean, transparent tools for promoting industries. On the other hand there is no simple way to tell whether a given policy has itself raised national income. Eventual competitiveness, one of the most popular tools which used to indicate the effectiveness of industrial policies, does not, as Krugman (1987) argues, necessarily provide justification for policy intervention, since it may reflect forces that had nothing to do with industrial policy.

1.8 Conclusion – Diversity in Deviations, Instruments and Assessments

The question of whether and in what circumstances industrial policies can be justified remains one of the most hotly disputed question in economics today. Yet at one level there appears to be a measure of agreement. Most of those concerned acknowledge a wide range of deviations from the competitive market paradigm – sunk costs, economies of scale and scope, oligopoly, externalities and complementarities, information and coordination failures, incomplete markets – which may justify government intervention to generate a more socially beneficial outcome. Thus the theoretical possibility of industrial policies is not in dispute. Rather, the disagreements turn around two main matters. The first is the empirical importance of these various deviation from the market paradigm in various types of economy. The second is the potential role for the government to act effectively to produce a preferred

outcome, rather than to make matters worse. Some argue that these deviations are in practice limited and that government is ineffective, so that there is virtually no role for industrial policy. Others argue that the deviations are pervasive and that in appropriate circumstances a strong government can be very effective, so that there is a major role for industrial policy.

Thus the different assessments of the viability of industry policy ultimately turn on empirical judgements rather than on theoretical differences. But whereas theory cuts through the complexity to provide a simple, compelling model, empirical judgements must come to grips with the diversity of real economic and industries, of many different types of market failures, of a wide range of different instruments to address these failures, of quite different levels of competence in different governments and agencies, and of the factors other than policy which affect economic outcomes.

The central theme of this chapter is the wide range of potential deviations from the market paradigm acknowledged in the literature, and the range of approaches to industrial policy to which they give rise, dependent on judgements of the empirical evidence and of the potential role of government to generate an improved outcome. The diversity of potential market failures in turn gives rise to diversity in a wide range of factors related to the key empirical judgements about industrial policy

2. Diversity and the Practice of Industrial Policy

2.1 Introduction

The central conclusion that emerges from the previous chapter is that there are different ways in which potential deviations from the market paradigm could occur. Along with these deviations, there emerge a range of approaches to industrial policy. Some of these approaches consider that deviations from the market are pervasive and that in appropriate circumstances a strong and committed government could play an influential role to generate an improved outcome. Some others are however sceptical about the potential role of government in situations where market deficiencies occur. Many of these theoretical approaches are built on assumptions choose for their simplicity. They are certainly helpful for analytical purposes because they assist us to examine the complicated world critically and systematically.

In practice, policy makers face much more complex situations than are implied by the theories. The ways, in which governments may be able to improve market failures and the policy instruments they can apply, will depend on the nature of market deficiency. In addition, the extent and form of policy choices may vary from one country to another. They are likely to be influenced by a variety of country-specific factors, including the development objectives pursued, the economic conditions faced and the political commitment to, and administrative capability for, market intervention. Complicating this situation further, variety of policy instruments, sometimes combinations of several policy instruments, are applied by countries with varying degree of intensity to achieve their desired objectives. Therefore, in practice, wide variations in policy applications can be observed between countries and also within a given country over a period of time.

In this chapter, the practical aspects of diversity in relation to industrial policies will be briefly outlined. This task starts in Section 2.2 with a review of definitions of industrial policies. In Section 2.3, the types of diversity will be

reviewed briefly under three categories namely, (a) deviations from the market model, (b) diversity in objectives and policies across and within countries and (c) the variety of instruments.

2.2 What is Industrial Policy?

As is clear from the theoretical arguments presented in Chapter 1, industrial policies have been subjected to extensive debate over the time. Despite these debates the terms "industrial policy" and "industry specific intervention" are still surrounded by ambiguities. Partly these ambiguities arise due to the lack of precise definitions of these terms.

One can find a vast array of definitions of industrial policies in the literature. The definitions used in the early 1980s are often broadly based,[1] in the sense that they tend to include all government actions which affect industry. Moreover they reflect the characteristics of industrial policies practiced by "advanced capitalist countries" such as the UK, France and USA. For instance, Pinder, a British proponent of industrial policy, regards all of the following as components of industrial policy:

> general industrial support policies such as manpower policy; fiscal and financial incentives for investment; public investment programs; public procurement policies; fiscal incentives for R&D; firm level policies such as specific R&D support; antitrust policy; merger policies to create 'national champions'; support for small firms; regional policies such as the development of physical and social infrastructure and the establishment of industrial complexes; generalised trade protection; sectoral policies such as the organisation of recession cartels in depressed industries; product upgrading in labour intensive industries. (1982, p. 52)

In the context of studies of industrial development in Japan, however, some changes became evident regarding the definition of industrial policies. Departing from the popular practice of including virtually every policy adopted by the government in the definition of industrial policy, several studies (for example Adams and Bollino 1982 and Johnson 1984) applied a more focused definition. Accordingly, industrial policies were classified into two categories, namely general policies and

[1]Several researchers, for example, Donges (1980), Corden (1980), Grant (1982), Arndt (1987), Caves (1986), Komiya et al. (1988), Stern (1990) have defined industrial policies as broadly covering all government actions which affect industry.

selective policies.[2] Although this categorization led to an improvement in the clarity of the concept, there was still no consensus regarding the contents included in each category.[3] For instance Johnson (1984) defines the term "industrial policy" as:[4]

> a summary term for the activities of governments that are intended to develop or retrench various industries in a national economy in order to maintain global competitiveness (p.7)... industrial policy has its own macro and micro aspects. At the macro level it provides governmental incentives for private saving, investment, research and development, cost cutting, quality control, maintenance of competition, and improvements in labour management relations. At the micro level it seeks to identify those technologies that will be needed by industry in twenty to thirty years and to facilitate their development, and on the other hand to anticipate those technologies that will decline in importance and to assist in their orderly retreat or to support them as a matter of social necessity. (p. 9)

These two groups, as Patrick elaborates, are as follows:

> The term "macro industrial policy" has been used to describe policies, especially incentives to save, to invest, and to engage in R&D, that increase the productive capacity of the economy in the longer run while leaving it to the market place to allocate resources among specific industries. Macro industrial policy accordingly is focused on the supply side of the economy, in distinction from aggregate demand management, which typically uses fiscal and monetary policy instruments... A broad definition of macro industrial policy includes any macroeconomic policies to increase the quantity and especially the quality of the factors of production – labor, capital, and natural resources – and the general level of technology. This definition incorporates educational policy as an important element.
>
> Industrial policy more typically is defined in micro terms: identification of certain specific industries deemed to have sufficient national importance to merit and receive differentially favourable policy treatment in order that those industries have access to resources in degrees or timing different from what would occur through the normal operations of the market place. A range of policy instruments can be used: direct subsidy payments, tax benefits, government-supported financing, protection from imports or promotion of exports, direct government purchases, funding of relevant R&D, special regulatory provisions, and so forth. (1986, pp. 4-5)

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[2] These two categories are also referred as functional and selective/industry specific intervention or industrial targeting.

[3] For other definitions with different contents see Adams and Bollino (1982), Krugman (1987), Okimoto (1986), Vestal (1995), Yue (1995), Wint (1998), Kim (1985), Itoh (1991) and World Bank (1993).

[4] The micro aspect – so called "industrial targeting"– has been further specified as the dynamic anticipation of the economically efficient allocation of resources for the future. Targeting thus does not mean the promotion of technologies that are unlikely to develop at all on their own; it means, rather, helping them rapidly to achieve the necessary economies of scale and manufacturing efficiency without which they can never become internationally competitive (Johnson 1984, p. 10).

As these definitions imply, the first category largely consists of macro economic policies, while the later includes micro policies designated for specific sectors. By the early 1990s, however, it was common to exclude macroeconomic policies from the definition of industrial policies. For instance, Wade, another well-known researcher in the area of industrial policy, interprets industrial policies as follows:

> Macroeconomic policies affect overall demand and while they affect different industries differently, they are not aimed at producing such differential effects. Industrial policies aim to aid industries, either to grow faster or to decline less disruptively, by affecting production and investment decisions of decentralized producers (and hence are more limited than the total of all government policies that affect industry). I distinguish second, between functional and industry-specific industrial policies. Functional industrial policies aim to affect a function across all or many industries (so they might also be called generic or horizontal industrial policies). Examples are subsidies for manpower training or for research and development. Industry specific (or selective, sectoral, or vertical) industrial policies target particular industries. Examples are promotion plans for steel, petrochemicals or semiconductors. (1990a, pp. 233-234)

Lall defines industrial policies as including:

> all actions taken to promote industrial development beyond that permitted by free market forces. Industrial policy can be thought of as having two elements: functional interventions and selective interventions. Functional interventions are those that remedy market failure without favouring any one activity over another. Selective interventions are designed to favour individual activities or groups of activities in order to correct suboptimal resource allocation, in a static or a dynamic sense. (1994b, p. 65)

Broadening sector-specific policies further, Adams and Vernon note that it is useful to think about industrial policies in the following way:

> *Industrial policies in general*: This category includes all policies that have a deliberate industrial or sectoral impact. It excludes broad macro and social policy initiatives intended to affect demand or income. The broad grouping may be divided into two types of policies.
>
> *Sector-specific policies*: These are policies directed at particular industries or sectors. They may be focused on an entire sector, microelectronics, for example, or they may be more narrowly targeted. Typically, these industrial policies are seen as "picking the winners" the so-called sunrise industries, but an important function, particularly in Japan, has also been to provide a smooth transition for the losers, the "sunset" industries.
>
> *Activity-specific policies*: These policies promote particular activities, like investment, research and development (R&D), and exports, but do not focus deliberately on a particular sector. (1999, p. 53)

All in all, it is clear that, broadly defined, industrial policies include a vast array of measures, which incorporate both macro and microeconomic policies. There is no doubt that all of these policies could have implications for industrial development, although it is difficult to identify clear boundaries between these two categories. Including all these policies into a definition of industrial policies, in fact, overloads the concept of industrial policy, rendering it unduly broad and leaving it with a limited use for practical purposes. Therefore, in practice, researchers tend to limit the concept of industrial policy to the narrow category – Johnson and Patrick's micro industrial policy, Wade's industry-specific policies, Lall's selective intervention and Adams and Vernon's sector-specific policies.

With these considerations in mind and for the purpose of limiting its scope, this study also wishes to confine its analysis to the selective policies. Therefore a definition introduced by Chang, which incorporates industrial policy objectives and also narrows down the scope to sector specific intervention, has been selected as a suitable definition for this study. This is:

> a policy aimed at *particular industries* (and firms as their components) to achieve the outcomes that *are perceived by the state to be efficient for the economy as a whole*. (1994, p. 60)

This definition is appealing for practical purposes in a number of ways. Firstly, by excluding the general policies and emphasising particular industries and firms, this definition allows the concept of industrial policy to be more focused. Secondly, it stresses the guiding principle of industrial policy, that is, to obtain increased efficiency for the economy as a whole. Finally, (with the phrase 'perceived by the state') it allows the definition to incorporate diversity and dynamic aspects of industrial policies, and the government's awareness of changing circumstances evolves over time.

2.3 Types of Diversity

As the various theoretical approaches discussed in Chapter 1, pointed out, there are many situations in which markets alone may not produce the best possible outcome. In such situations, policy intervention may be helpful to improve the situation. The ways in which government may be able to assist, and the policy instruments it can

apply, will depend in part on the nature of the market deficiency. In addition, the preferred policy intervention may differ from one country to another, as policy decisions are likely to be influenced by a variety of factors such as demographic characteristics, resource endowment, level of development, level of technology, size distribution of enterprises, private sector versus government ownership, changes in political regimes, the quality of domestic institutions and officials, and so on. Moreover, public policies are not solely based on pure economic aims such as profit maximization, but often need to take into account broad social objectives. With these various factors it is inevitable that there will be a variety of policy choices made in different countries. These diversities are discussed here briefly under three sub-headings: deviations from the market model, diversity in objectives and policies across and within countries and the wide variety of instruments available.

2.3.1 Deviations from the Market Model

As we noted in Chapter 1, a deviation from any condition assumed by the theory of perfect competition – such as the existence of entry barriers, the presence of externalities and information asymmetries and so on – may lead to the market outcome being inefficient. As the various models pointed out there are many ways in which government could act to improve such situations, but also many ways in which that actions could fail to be successful. .

Under the competitive markets, for example, it is assumed that there is free entry and exit but in practice there are many constraints facing firms interested in entering a given market. As many economists note, entry barriers arise largely due to the need for large-scale investments, which in turn generate economies of scale. Generally, when initial set up costs are high, the private sector may be reluctant to invest as such investment involves a high risk and a large commitment of time. In the context of developing countries, where financial markets are underdeveloped, obtaining finance for such investments may become even more difficult. In such circumstances, with certain policy measures such as providing subsidies, tax concessions or direct finance, it may be possible that private sector participation can be induced. Otherwise, the government might take initiatives in setting up such investment activities itself, in industries involving high set up costs. This has been the

case in setting up of basic industries such as steel and chemicals in Korea, Malaysia and Taiwan.

In addition to resource constraints, rapid changes in technology make entry into the existing market even more difficult. In such circumstances, setting up or encouraging investments involving high initial costs may not be sufficient to overcome existing barriers. In many industries competitive advantage seems to be determined more by the knowledge generated by firms through R&D and experience than on the basis of the comparative cost principle. To overcome these situations, initiatives such as encouraging imperfect competition, government procurement, and government sponsored R&D could be applied. In the early stage of their industrial development, for instance, both Japan and Korea encouraged an oligopolistic market structure in certain industries such as the automobile industry, and electronic products, arguing that they would help local firms to challenge foreign rivals which possess advantages in technological knowledge and innovation.

Moreover, even if adequate resources and technology are available, sometimes investment in certain activities, particularly those activities relying on technology and innovation, may be discouraged because of externalities and the resulting wedge between private and social rate of returns. In such situations firms may be unable to capture most of the returns arising from their investments and under competitive conditions, investment is likely to take place at a sub-optimal level. However, with some form of support, such as the provision of subsidies for R&D, or of tax concessions, firms might be compensated for the dissipated returns and the socially optimum level of investment could be attained.

These examples suggest that there are many ways that market deficiencies could occur. Depending on the particular character of an economy, there thus may exist a wide variety of circumstances to which policy makers may see a need to respond. These market deficiencies may also vary within a given nation over time.

2.3.2. Diversity in Objectives and Policies Across and Within Countries

Every economy pursues policies that, in practice, significantly affect both the industrial structure and the aggregate productive capacity of the economy. These policies are influenced by host of factors within each country such as the state of development, the size distribution of enterprises, the level and nature of resource endowment, the nature of the political economy and so on. Thus different countries are likely to have different objectives, and one cannot expect to find a uniform set of policies that are best to meet the objectives of all economies.

In the context of developing countries, the resources that are required for industrial development such as finance, technology, and skills are scarce or inadequately developed. Therefore they require more support from the government than that of developed countries. The policy choices of countries may further differ reflecting the state of development, the objectives, the nature of the political and social organization, and the resources specific to each country. While addressing their economic and social needs more often developing countries try to achieve multiple objectives such as export promotion, technology development, employment creation, and regional development through industrial policies. Developed countries where private sector initiatives are prominent, financial and other markets function reasonably well pay their attention on increasing market share and establishing competitive edge through implementing industrial policies.

The priority given to each development objective varies from country to country, depending on the social, political and economic situation of the country, thus resulting in further differences in strategies. As a country deficient in natural resources, for instance, Korea paid considerable efforts to achieving economic growth through its industrial policies, while emphasizing the importance of export promotion, national sovereignty and upgrading the industrial structure. Better endowed with natural resources, Malaysia by contrast has paid more attention on redressing social imbalances – particularly towards stimulating Malay participation – over economic growth in the process of industrialization. In Korea, government officials have enjoyed more autonomy in their decision making process, and were generally free from the influence of interest groups, thus they were able to focus more on economic

growth than social objectives (Adams and James 1999; Kwon 1994; Crone 1994; Boyd 1994; Lall 1996; McKay and Missen 1995).

These country-specific differences in objectives can also be reflected in diversities due to the application of the same instrument with varying degree of intensity. Let us take sector specific intervention, which is considered to be prevalent among Asian countries, as an example. Sector specific intervention appeared to be an integral part of the industrialization process in countries like Japan and Korea (at least in their early stages), being used for developing a number of strategic industries such as steel, cement and chemicals. Other countries in the region have, however, followed these policies with varying degrees of intensities. Some countries have limited these sector specific intervention policies to gain a competitive advantage in certain industries, such as the Proton Saga automobile in Malaysia and technology leapfrogging in the aircraft industry (scrapped in 1998) in Indonesia. Some other countries, such as Hong Kong and Thailand have paid little attention to sector specific policies. Likewise, great diversities can be found in regard to policies affecting domestic and foreign investment, trade and finance. For instance, though foreign direct investment is widely used as a tool for promoting exports and technology, some countries use liberal policies while other countries apply a restrictive approach (Adams and James 1999; Adams 1999; Adams and Vernon 1999; Crone 1994; Boyd 1994).

Responding to the political and economic changes, competitive threats and resource constraints, objectives may change and industrial policies may also vary from time to time within a given country. A country, starting its industrialization process with import substitution strategies, may shift to export promotion strategies due to a recognition of limited domestic market capacity and of other limitations associated with this strategy. Similarly, a country promoting light industries, may shift towards technology intensive products due to the emergence of competitive threats and of shortages of labour. Further, as industrialization progresses some economies may face regional disparities and as a result may introduce policies that favour the development of backward regions. In recent years, for example, Indonesia has concentrated on encouraging companies to invest in the less developed Eastern islands while Thailand offers various incentives to investors to locate outside

Bangkok. Thus, economies adjust their objectives along with social economic and political changes, introducing new and more sophisticated policy instruments, and sometimes altering the existing ones to achieve these revised objectives (Adams 1999; Adams and Vernon 1999).

2.3.3 The Variety of Instruments

As we noted earlier, the appropriate policy intervention depends on the nature of the market deficiency, on country specific factors and on other dynamic factors. Consequently, a vast variety of policy instruments are applied in practice. As noted in section 2.2 many authors employ a broad definition of industrial policy. In the context of industrial policies broadly defined, the available instruments include those aimed at promoting industrial activities in general (macro policies) as well as those aimed at for specific industries (micro policies).

Though in general broadly confined to those two categories, one can find a vast variety of classifications of industrial policy instruments in the literature.[5] For example, Bhattacharya and Linn, identify ten broad categories of industrial policy instruments as follows (1988, p. 103):

1. Macro economic policies (fiscal, monetary, and exchange rate policies)
2. Trade policy (protection and export promotion policies)
3. Financial sector policies (including policies affecting the financial sector as a whole, and policies directly affecting the supply and demand for industrial finance)
4. Labor market policies
5. The tax structure
6. Industrial investment incentives
7. Industrial regulation and licensing
8. FDI (foreign direct investment) policies usually involving a combination of 2, 6, and 7 above)
9. Direct government investment and ownership (covering state enterprises activities and public investment in large industrial projects)

[5] For other classifications see Itoh et al 1988; Okimoto 1986; Greenaway and Milner 1993; Adams and Bollino 1982).

10. Infrastructure (including physical infrastructure such as utilities, transport, etc. and "software" support such as R&D, marketing and technology development policy more generally).

Including both general and selective instruments, Donges (1976) classifies these instruments under five categories: production, factor market, foreign investment, imports and exports (see Appendix 2.1 for details). This latter classification, together with Appendix 2.2 which shows major export promotion incentives in Korea clearly demonstrate how industrial policy instruments, in practice, are complex, dynamic, and diverse not only across different countries but also within a given country

These diversities may be very important in terms of the assessment of the effectiveness of industrial policies. The objectives for policy and the industries selected for promotion may differ from one country to another, and they also differ within a given country from time to time. Therefore, to assess the effectiveness of industrial policies appropriately it is important not only to identify these diversities for the country being analysed but also to ensure that this diversity is allowed for the analytical methodology. Some further information on how this particular task could be addressed may be provided through a detailed examination of the diversity and the incidence of industrial policies in a given country and industry at a particular time. In this respect, this thesis will investigate in forthcoming chapters the diversity and the incidence of industrial policies in three sample countries – South Korea, Malaysia, and Thailand.

2.4 Conclusion

Supplementing the theoretical arguments presented in the previous chapter, this chapter highlights the practical aspects of diversity of industrial policies. As evident from the discussion of this chapter, in practice, the extent and form of policy choices may vary not only between countries but also within a given country over a period of time, due to the combination of various factors. First and foremost, they could be expected since market deficiencies may arise in a wide variety of forms. Secondly, county-specific factors could certainly have a significant influence on policy choices. Combined with these two factors, thirdly, a variety of policy instruments, which are

constantly changing in response to political, economic social and technological changes, create further diversities in policy choices.

These variations in policy choices may create a considerable impact on industrial performance. Therefore, to assess the effectiveness of industrial policies appropriately it is important not only to identify these diversities for the country being analysed but also to ensure that this diversity is allowed for the analytical methodology. To what extent the existing empirical studies have paid attention to this important aspect when assessing the effectiveness of industrial policies will be examined in the next chapter.

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Appendix 2.1

A Profile of Major Post-War Industrialization and Trade Policies in the Kiel Sample Countries

Type of Policies	Countries Concerned
Production	
1. Industrial licensing system under which the establishment, expansion, and both sectoral and geographical alteration of industrial activities require governmental approval	Brazil, Egypt (since 1957), India, Mexico, Pakistan, Spain (relaxed since 1963) Taiwan (gradually lifted after 1954)
2. Selective promotion (generally by tax incentives) of industries designated as "essential", "desirable", or "pioneering"	All countries but Hong Kong
3. Creation of industrial estates	India, Korea (since 1966), Malaysia, Singapore Spain (since 1964) Taiwan (since 1965), Turkey (since 1963)
4. Price controls (at times) on selected industrial goods required as inputs by "priority" sectors	Brazil (since 1964), Colombia, India, Malaysia, Mexico, Pakistan, Spain, Turkey, Yugoslavia
5. National plans for economic development over three and more years (indicative for the private sector, compulsory for the public sector)	Brazil (since 1964), Colombia, Egypt (since 1957), India, Israel (since 1958), Korea, Malaysia (since 1955), Mexico, Pakistan, Spain (since 1964), Turkey (since 1963), Yugoslavia
6. Direct government investment in industry (public enterprises)	All countries but Hong Kong, Israel, Korea and Singapore
Factor Market	
1. Minimum wage legislation (including high social charges and severance pay regulations)	Brazil, Colombia, Egypt, India, Malaysia, Mexico, Pakistan (since 1969), Spain (since 1963)
2. Interest rate ceilings and/or credit rationing (not determined by the business cycle considerations)	Brazil (relaxed since 1964), Egypt (since 1957), Korea (relaxed since 1965), Mexico
3. Tax benefits for business income derived from investment such as tax holidays lasting several years reduction of income or profit tax exemptions or ceilings loss carry forward provisions allowances for accelerated depreciation	All countries but Hong Kong and Yugoslavia, to varying degrees
4. Exemption from or reduction of customs tariffs on capital goods, which are not domestically produced.	Brazil (since 1957), Egypt, Korea, Malaysia, Mexico, Taiwan, Turkey
Foreign Investment	
1. Prohibition of private foreign investment	Yugoslavia (until 1967)
2. Investment proposals made subject to government approval	Colombia, Egypt, India, Korea, Malaysia (since 1973) Mexico, Spain (until 1959) Turkey, Yugoslavia (since 1967)
3. Requirement of domestic majority ownership and constraints on profit remittances abroad and capital repatriation	Colombia, Egypt (gradually liberalized after 1967), India, (selective) Mexico, Spain (until 1959), Yugoslavia (since 1967)
4. Exclusion of foreign investment from certain (key and or inessential and or saturated industries)	Brazil, Colombia, Egypt, India, Mexico, Pakistan, Spain, Turkey, Yugoslavia (since 1967)
5. National treatment with virtually no foreign exchange restrictions and domestic ownership requirements	Brazil, India, Israel, Korea, Pakistan, Singapore, Spain (since 1959), Turkey,
6 Direct subsidies and tax incentives	Korea, Malaysia, Mexico, Taiwan,

Imports	
1. Import licensing combined with quotas and/or at times with prohibitions of certain imports (considered either as luxuries or as locally available)	All countries but Hong Kong and Singapore to varying degrees, gradual liberalization in Brazil after 1967, Israel after 1962, Korea after 1960, Spain after 1959 and Taiwan after 1958
2. Tariffs (generally ad valorem) and other price measures (such as indirect taxes, surcharges or prior deposit requirements) generally with escalating rates form lower to higher levels of fabrication	All countries but Hong Kong to varying degrees
3. Multiple exchange rates	Brazil (1953-57), Colombia, Egypt (1957-62), Israel (1952-55), Korea (until 1964), Spain (until 1959), Taiwan (until 1963), Turkey (until 1960), Yugoslavia (until 1961)
Exports	
1. Licensing for exports (totally or partly) with or without minimum export price requirements	Brazil (until 1964), Colombia (since 1973), Egypt (since 1959), India, Malaysia (until 1969), Pakistan, Spain (until1959), Taiwan (until 1958), Turkey (gradually liberalized after 1958), Yugoslavia
2 Taxes and or customs duties on export	Egypt, India, Malaysia, Mexico, Pakistan, Spain (until 1959), Taiwan (until 1954)
3. Fixing of export targets	Korea (since 1962), India (since 1970),
4. Remissions and compensation of tariffs on imported products used in finished exports and exemptions from indirect taxes on domestic production	All countries mostly starting in the early sixties
5. Export vouchers for import replenishment with premiums on their resale, priority allocation of foreign exchange to exporters for the importation of necessary input or foreign exchange retention quotas	Colombia, Egypt (temporarily since 1960), India, Korea (until 1960), Mexico, Pakistan, Taiwan (until 1963), Turkey (since 1968), Yugoslavia (since 1966)
6. Income tax concessions for earnings from export (including special depreciation allowances)	Brazil (until 1971), Colombia (since 1967), India (since 1960), Israel (since 1965), Korea (since 1961), Malaysia, Mexico (since 1958), Pakistan (since 1963), Singapore, Taiwan (since 1960), Turkey (since 1969)
7. Export credits (at preferential conditions) and credit insurance	All countries but Hong Kong and Singapore, to varying degrees and starting in the sixties
8. Exchange rate policy of gradual devaluation (sliding peg)	Brazil (since 1968), Colombia (since 1967), Israel (since 1975), Korea (since 1965)
9. Establishment of export processing zones	Colombia (since 1970), Hong Kong, India (since 1972), Korea (since 1970), Malaysia (since 1972), Mexico (since 1962), Singapore, Taiwan (since 1966)
10. Participation in international free trade areas	Brazil (since 1961), Colombia (since 1961 and 1969), Hong Kong, India, Israel (since 1975), Malaysia, Mexico (since 1961), Pakistan, Singapore, Turkey (since 1964)
11. Government assistance to marketing abroad	All countries to varying degrees and generally beginning in the sixties.

Source: Donges and Riedel (1976, cited in Donges 1976, pp. 630-631).

Appendix 2.2

Major Export Promotion Incentives, Korea

Types of Incentives	Duration
Tax incentives	
Commodity tax exemption	April 1950-1973
Business tax exemption	January 1962-1973
Reduction of corporation and income tax by 50 per cent on earnings from exports	January 1961-December 1972
Accelerated depreciation on allowance for fixed capital directly used for export production in mining, fishing, and manufacturing	January 1961-1973
Tax credit for foreign market development expenditures	August 1969-1973
Foreign market development reserve system expanded	1973
Overseas business loss reserve system established	1973
Overseas investment loss reserve system established	1973
Tariff incentives	
Tariff exemptions on capital equipment for export production	March 1964-December 1973
Tariff payments on an instalment basis for capital equipment used in export production	January 1974-
Tariff exemptions on raw material imports for export production	April 1961-June 1975
Tariff drawback on imported raw material used for export production	July 1975
Wastage allowance	July 1965-
Deferred payment system for tariff	July 1975-October 1988
Financial incentives	
Financing for export sales	February 1948-July 1955
Export shipment financing	June 1950-July 1955
Export promotion fund financed by counterpart fund	November 1959-January 1964
Financing imports of materials to be used in export production	October 1961-February 1972
Export credits (trade credit before 1961)	June 1950-
Financing suppliers of U.S. offshore military procurement	September 1962-
Fund to promote export industry	July 1964-September 1969
Fund to convert small and medium size firms into export industries	February 1964-
Fund to prepare exports of agricultural and fishery products	September 1969-
Foreign currency loans	May 1967-
Financing exports on credits	October 1969-
Automatic export financing system introduced	1976-
Differentiated export financing for large versus small and medium companies	October 1986-
Overall export financing system introduced	October 1985-
Other promotion schemes	
Foreign exchange deposit system	June 1949-January 1961
Trading license based on export performance	January 1953
An export bonus with preferential foreign exchange	1951-May 1961
Payment of export subsidy	1954-1955 and 1960-65
Discount on railroad freight rates	1958-
Monopoly rights on exports of specific items to specific areas	April 1960-November 1980
Creation of exporters associations for various export products	September 1961-
Financing KOTRA	March 1962-
Export –import link system	November 1962-March 1965-66-
Discount on electricity rates	1965-1976
Waiver issuance for shipping	1965-
Local L/C system	March 1965-
Differential treatment of traders based on export performance	February 1967-
Export insurance	January 1969
Export-import bank	June 1976-
Special loan privileges for small and medium exporters' raw material imports	August 1987-
Export financing for big corporations discontinued	February 1988-

Source: Hong, (1979, cited in Sakong 1993, pp. 238-239).

3. Ignoring the Diversity: Empirical Studies of the Effectiveness of Industrial Policy in East Asia

3.1 Introduction

The analysis undertaken so far suggests that neither the market nor the government can alone handle economic activities efficiently. In particular, there is a wide variety of ways in which markets may fail, and hence in which the competitive markets alone may not achieve the social optimum. As a result, various theoretical approaches to industrial policy claim that it is possible to improve the outcome, in cases where market deficiencies occur, through policy intervention. Given the diversity of possible market failures, and of the instruments available to governments, there are many ways in which government could intervene. As a result one could expect diversity in policy applications. At the same time, government policies may fail to achieve their objectives, just as markets may fail, so that there is no guarantee that these interventions will be effective.

In the previous chapter it was suggested that these diversities are even more complex in practice than is implied by the theoretical rationales. This is especially so in the context of industrial policies, since they are influenced by the various country specific factors. As a result, one cannot expect to find uniform policies between countries. Policies in a given country are also likely to change over a period of time, since they are adjusted to changing political, economic and technological developments.

By implementing industrial policies countries, in particular the developing countries, expect to achieve multiple objectives. Among other objectives, the majority of these policies are aimed at: (a) changing industrial structure through influencing resource allocation; (b) increasing exports; (c) technological development through policies designed to correct market failures and overcome imperfect

information; (d) raising economic welfare and (e) satisfying political demands, such as increasing indigenous participation, regional distribution and so forth. To achieve these objectives a combination of trade, fiscal and financial instruments are often used, depending on the objectives, the relative status of development, the resource endowment, and the political and economic structure of the country. As noted in the previous chapter, these instruments and their applications may vary across countries and also within the same country over time. These variations may have a considerable impact on industrial performance. The performance of the industrial sector may further be influenced by the selective industrial promotion exercised by certain countries, in the belief that shifting industrial structures toward new and more modern sectors increases the opportunities for capturing the dynamic scale economies that result from learning. Many other factors, both national and international, may also affect the growth performance of a particular country over a given period.

These issues, especially in relation to the role of industrial policies in East Asia, have been the focus of a considerable body of literature. In a number of studies, the analysis has been focused on changes in policy direction, major reforms in policy instruments, the degree of industrialisation, the changing pattern of manufacturing activities, and the role of the institutions of industrial policy in relation to the resulting evolution of the industrial structure (Smith 1994; Kim 1985; Boyd 1994; Crone 1994; Chowdhury and Islam 1993; Brown 1993; Amsden 1989; Wade 1990a, 1990b; Petri 1993; Thomas and Wang 1993; Chang 1994). Despite an outpouring of literature, only a handful of studies have analysed the effectiveness of industrial policies through a detailed empirical analyses. The majority of the existing studies not only base their conclusions on implicit evidence but also produce their results while assuming that industrial policies were a once-and-for-all event. More generally the existing analytical approaches for assessing empirically the effectiveness of industrial policies have paid limited attention to the diversity of industrial policies. In this chapter we argue that this as one of the main limitations of these empirical studies.

The main objective of this chapter is to review each of the available empirical studies to document their findings on the effectiveness of industrial policy and to assess the adequacy of their methodologies. With this in view, Section 3.2 explores

the empirical studies that have been undertaken so far on newly industrializing Asian countries, focusing on their methodologies, findings and limitations, if any. The first part of this section will examine the cross-country studies, and this will be followed by an examination of country-specific studies. The latter will be discussed under two broad headings: the effectiveness analysis in terms of exports and in terms of other aggregate measures. Common limitations and gaps in the empirical literature are presented in the Section 3.3. In effect, this type of analytical review will help to set the context for finding an alternative technique for assessing the effectiveness of industrial policies, which this study aims to do.

3.2 Empirical Studies Assessing the Effectiveness of Industrial Policies

By using various indicators such as the performance of exports, changes in the industrial structure and changes in productivity, a number of attempts have been made to evaluate empirically the effectiveness of industrial policies in East Asia. The results of these studies are mixed. Some studies (Agrawal, Gokarn, Mishra, Parikh, and Sen 1996; Amsden 1989; Chang 1994) concluded that the industrial policies had a positive impact on these economies. Other studies (Wade 1988, 1990a, 1990b; Westphal, Rhee and Pursell 1981), which examined the institutional framework in more detail, also concluded that the wide range of government intervention – from planning, direct involvement in production, providing a conducive atmosphere through incentives and other institutional reforms, to formulating industry specific policies – has played a significant role in East Asian economic growth.

These claims are questioned by several other studies. Based on the overall pattern of changes in value-added, employment and exports for the Republic of Korea and Taiwan, Dollar and Sokoloff (1994), argued that, while government policies are acknowledged as being crucial in ensuring a sound macro environment, industry specific interventions have not been an important cause of growth. Using changes in industrial structure and in productivity as measurements, the World Bank study (1993) also expressed a similar view, stating that the selective policies were ineffective. Some country-specific studies (Stern 1990; Imai 1986; Okimoto 1986), which analysed the effectiveness of industrial targeting on a case by case basis, concluded

that some industry specific interventions were effective while others were not effective.[1]

As this evidence, and the forthcoming empirical analyses, suggest, controversies regarding the effectiveness of industrial policies remain unresolved. These inconsistent results may be partly attributed to methodological differences and to the lack of an explicit conceptual framework. To understand these shortcomings more clearly, each of these comprehensive empirical studies that have placed emphasis on analysing the effectiveness of industrial policies will be reviewed in the following sections.

3.2.1 Effectiveness of Industrial Policies: Cross-Country Studies

Of the studies undertaken so far, the East Asian Miracle (EAM) report of the World Bank (1993) is the most well known. This study produced an overall analysis of both economic and industrial policies of a number of East Asian countries (Japan, Korea, Taiwan, Hong Kong, Singapore, Malaysia, Indonesia, and Thailand). According to this study, industry policies were defined as "government efforts to alter industrial structure to promote productivity-based growth" (World Bank 1993, p. 304). For analytical purposes this study classified industries into two categories, as promoted and non-promoted sectors. Capital and technology intensive industries[2] were included in the former category while the latter contained all other industries. Under this conceptual framework, the EAM report employed three empirical tests – the first two tests analysing the changes in industrial structure and the third assessing productivity growth – to analyse the effectiveness of industrial policies.

Using cross-country regression analysis, the EAM report firstly examined whether the shares of value-added in promoted industries were greater than the level

[1] Okimoto (1986) and Imai (1986) produced a descriptive analysis on individual industries, based on the experience of Japan. Stern (1990), on the basis of Korean experience, analysed a number of heavy and chemical industries, comparing the economic rate of return and opportunity cost of capital of individual industries.

[2] These two categories were however not clearly specified in the EAM study. In general, iron and steel, automobiles, metal products, shipbuilding, machinery, electronics, and industrial chemicals were classified as selectively promoted sectors.

which was predicted by their factor endowment. To ascertain the transformation of the sectoral structure of the manufacturing sector in the sample Asian countries this study utilized estimates based on the following equation, which was introduced by Chenery (1960) and later modified by Syrquin and Chenery (1989):

$$\log(VA_i / GDP)_j = b_0 + b_1 \log(GDP / POP)_j + b_2 (POP)_j \qquad (1)$$

where VA_i is value-added originating in sector i in economy j, GDP is gross domestic product, and POP is total population. As the study pointed out this equation, which captures the influence of demand elasticities and the evolution of supply, provides a benchmark to determine whether the relative importance of industrial subsectors in the sample economies differed significantly from international norms. The underlying assumption when applying this equation is that if industrial policies are successful it will alter the sectoral composition differently than that of the market based principles.

For this purpose, the actual shares of value-added of various industrial sectors for the East Asian economies were compared with the international norms predicted. The estimates, which were obtained by using the Syrquin and Chenery 1989 equation for each industry across a set of countries having a similar level of income (per capita GDP), were taken to represent the international norm in this study.[3] To examine changes relative to this norm, a set of indicators were established, as follows: values equal to 1 represent conformity to the international norm; values less than 1 indicate that the sector is smaller than predicted; and values greater than 1 indicate that the sector is larger than predicted. The results were presented in the form of the ratio of actual v^A, to predicted v^P, shares of value-added (reproduced here as Table 3.1). Based on the findings, this test concluded that:

[3] In his theoretical model, Chenery (1960) attempts to incorporate changes in both demand and supply conditions into the growth model. This model is expressed for empirical purposes as $\log V_i = \log \beta_{i0} + \beta_{i1} \log Y + \beta_{i2} \log N$, where V_i is per capita value added, β_{i1} is the growth elasticity $\left[\frac{dV_i}{V_i} \Big/ \frac{dY}{Y}\right]$ and β_{i2} is the size elasticity $\left[\frac{dV_i}{V_i} \Big/ \frac{dN}{N}\right]$. As this equation outlines, per capita value added depends on per capita income and population, which represents the size of the domestic market. Later, in the study Syrquin and Chenery (1989) all the components are expressed as shares of GDP. As a result, the first term in this equation is expressed as a share of GDP.

> three economies known as manufacturing powerhouses have larger overall manufacturing sectors than international norms based on the international norms for economies with similar incomes would predict: Hong Kong (1.26), Korea (1.26), and Singapore (1.38). (World Bank 1993, p. 327)

Analysing the effects of selective promotion, and based on the findings reproduced here in Table 3.1, the report declared that the results were not particularly impressive. More specifically, it asserted that despite the government's extensive efforts to encourage capital and technology intensive sectors in Korea and Singapore, labour intensive sectors, particularly the textiles and garments sector (one of the non-promoted sectors) were bigger than international norms predicted in 1988. In its concluding remarks stressing the poor performance of selective promotion, the report further added that "during the same period, Korea merely maintained the international norm in chemicals, a heavily promoted sector; while other heavily promoted sectors, basic metals and metal products and machinery, achieved only modest improvements" (p. 313).

Secondly, changes in industrial structure were also analyzed in the EAM report by examining the relationship between wages per worker and the growth of the share of value-added in each industrial sector at the beginning and end of the intervention period. For this purpose, four simple regressions for each economy were run, across industry sectors for given periods, using the form:

$$v^*_i = \mathrm{f}(x_i) \qquad (2)$$

where v^*_i is the change in the current price share of value-added in sector i, relative to value-added in all manufacturing. The independent variable x_i represents, in the four regressions, the wage per worker at the beginning (w_b) or at the end of the intervention period (w_e), and the value-added per worker at the beginning (va_b) or at the end of the intervention period (va_e), for industry i (p. 330). Since all of the

Table 3.1 Actual/Predicted Share of GDP Originating in Manufacturing Sectors

Economy/Region	Food beverages tobacco	Textiles and clothing	Wood & wood products	Paper & printing	Chemicals & rubber	Non metallic minerals	Basic metals	Metal products & machinery	Other	Total manu-facturing
Hong Kong										
1973	0.21	10.31	0.89	0.53	0.78	0.14	0.37	2.86	0.35	1.25
1988	0.43	118.95	0.36	0.65	0.67	0.14	0.17	1.96	0.38	1.26
Indonesia										
1973	1.63	0.75	0.3	0.18	0.4	0.2	0	0.44	0.06	0.62
1986	0.75	0.25	1.42	0.06	0.54	0.95	0.62	0.11	0.01	0.57
Japan										
1963	0.75	2.98	2.42	1.36	0.73	0.63	1	2.41	0.67	1.23
1989	0.98	13.52	0.88	0.66	0.69	0.52	0.71	1.69	0.14	0.97
Korea Rep. of										
1968	0.99	1.75	2.03	1.04	0.94	0.73	0.52	2.07	0.2	1.04
1988	0.85	2.74	0.71	0.64	0.99	0.62	1.13	2.76	0.32	1.26
Malaysia										
1969	0.35	0.25	1.55	0.89	0.8	0.05	0.69	1.03	1.43	0.64
1981	0.94	0.68	3.28	0.57	0.89	0.7	0.57	2.44	0.07	0.97
Singapore										
1973	0.31	2.14	2.4	0.49	2.09	0.75	1.53	12.56	0.13	1.41
1989	0.26	11.32	0.51	0.47	1.72	0.27	0.61	5.1	0.14	1.38
Thailand										
1968	0.9	1.21	4.89	0.7	0.36	1.69	0.22	3.16	0.09	0.95
1986	0.34	3.33	1.85	0.71	0.65	1.39	0.33	1.82	0.22	1.68

Source: Pack (1993, as cited in World Bank 1993, p. 306). (Every attempt to find this original paper was unsuccessful.)

countries under observation are relatively labour abundant, in this test it is assumed that if industrial structure is determined primarily by market forces, low wages and low capital intensity at the beginning of the period of active industrial policy will predict the pattern of industrial growth. In such a case, it is predicted that the condition dv_{i*}/dw_b and $dv_{i*}/dva_b < 0$ will hold and there will be a negative relationship between the variables observed. That is, higher growth will have been expressed in industries with lower starting wage or value-added levels. On the other hand, it was also assumed that if selectively promoted industries, in which the starting wage rates would have been relatively high, were successful, then there would be a positive relationship between these two variables. Hence, the data should show that $dv_{i*}/dw_b > 0$ and/or $dv_{i*}/dva_b > 0$. Alternatively, the impact of selective promotion is examined by using wages and value added at the end of the intervention period. Thus, if the sectors that grew most exhibited a high capital or high wage intensity at the end of the period, as might be implied by the selective promotion strategy, the data should satisfy the dv_{i*}/dw_e *or* $_{dvi*}/dva_e > 0$ condition. Thus for all four sets of regressions a positive coefficient on these variables is supportive of the success of a selective promotion strategy, while a negative coefficients is the reverse.

The test, using a two-digit ISIC classification of industrial sectors based on equation (2), was performed on each of the four Asian tigers plus Japan. Based on the regression results reproduced here in Table 3.2, the EAM report concluded that:

> Our effort to differentiate between a comparative-advantage based evolution of industrial structure versus one characterized by significant intervention is notable mainly for a number of negative results. In particular, in Korea - the economy for which significant intervention is best documented - during 1973-80 the most rapid growth in sectoral shares of value-added occurred in lower-wage or lower value-added per worker sectors. In Korea at the two-digit level, sectoral growth was broadly market conforming in terms of traditional factor intensities... In Singapore, for the period 1980-89, output grew more rapidly in more capital and knowledge intensive sectors, supporting the view that the Singaporean authorities successfully intervened to encourage increasingly capital-intensive development. But, given the rapid growth in the capital-labor ratio in Singapore, this result also conforms to factor proportions theory predictions. (World Bank 1993, pp. 314-315)

In the light of the evidence of both tests, which examined the changes in the industrial structure, the EAM study concluded that selective policies did not have much of an impact on changing the resource allocation in the observed countries.

Thirdly, the EAM study examined whether the growth rates of total factor productivity (TFP) were higher in promoted sectors. The underlying assumption of this test was that if rates of productivity change in industry were low overall or in promoted sectors, industrial policy was ineffective. The growth accounting procedures used in this study implied that:

> aggregate TFP in any period can be decomposed by weighting each sector's level of total factor productivity, $A_{i,t}$ by the sector's share in value-added, $v_{i,t}$. The growth of TFP will then depend on changes in $A_{i,t}$ and changes in $v_{i,t}$. Algebraically, this relation can be written as:
>
> $$\Delta LogA = \Sigma_i (v_{it} \log A_{i,t} - v_{i,t-1} \log A_{i,t-1}) \quad (3)$$
>
> Thus equation (3), gives the growth in A due to the increase in productivity of existing sectors, $\log A_{i,t} > \log A_{i,t-1}$, or the growth in the value-added share of these sectors, $v_{i,t} > v_{i,t-1}$ whose productivity is growing. (p. 328)

Under this framework it is postulated that if industrial policies are successful favoured sectors (*f*) will have higher growth of TFP than non-favoured sectors (*b*). Then, the condition $A_{f,t} > A_{f,t-1}$ and $A_{f,t} > A_{b,t}$ will hold.[4]

The results of this productivity test as reproduced here in Table 3.3, demonstrated that the TFP growth was high by international standards in the observed countries (Japan, Korea and Taiwan). However, the report asserted that productivity change has not been higher in promoted sectors except in Japan. In the case of Korea, for example, the report pointed out that:

> although the Korean government selectively promoted chemicals and iron and steel (included in basic metals), the large growth in the share of iron and steel was accompanied by quite low TFP performance between 1966 and 1985; textiles and clothing, conversely, had very high rates of TFP growth. (p. 315)

Like the other two tests outlined previously, these findings were also attributed to the combination of competitive discipline and well functioning factor markets.

The EAM report undoubtedly made a valuable contribution, especially by producing a conceptual framework for discussing the role of the market and the

government, and by investigating key issues such as the role of investment, exports and industrial policies in East Asian countries empirically. However, the conclusions based on the empirical tests of the effectiveness of industrial policies in general, and of selective promotion in particular, have to be taken with care for two main reasons: the presentation of selective evidence and the limitations of the methodologies applied in this study.[5]

The presentation of empirical evidence appears to be selective in all the three tests reported in this study. As we noted previously, for its first test the industrial performance of sample countries was compared with an established international norm. In terms of the standards specified by this test, if the estimated figures were greater than 1, that particular sector was considered to be larger than the international norm. As can be observed from Table 3.1, in the textiles and clothing sector six countries out of the sample of eight have satisfied the criteria of superior performance relative to international norms. The other labour intensive sectors rarely satisfied the specified criteria. Despite this limited evidence, the EAM report concluded that labour intensive sectors perform better than capital intensive sectors.

Moreover, in the case of Korea, the frequent example they cited to substantiate their arguments, the evidence is contrary to their conclusions. As the estimates indicate, a number of promoted sectors in Korea (basic metals, metal products and machinery, which cover a wider range of sectors as the report itself defined (p. 308) including, iron and steel, electronics, machinery and transport equipment) reported satisfactory progress in line with the assumptions imposed by the study. In fact, the metal products and machinery sector's ratio in 1988 is slightly higher than that of the textiles and clothing sector. In addition, the conclusions were based on the comparison of two selected years which varied from country to country for data reasons. For instance, in the case of Korea performance results were compared with 1968 and 1988. The performance of the year 1988 may not solely be attributed to

---

[4] This study defines two types of sectors: those favoured by government policy*f*, and those subject to benign neglect *b* (p. 328).

[5] See Lall (1994), Amsden (1994), Wade (1994), Rodrik (1994b), Kwon (1994a), Perkins (1994), Yanagihara (1994) and Agrawal et al. (1996), for criticism regarding the EAM study.

Table 3.2 Signs of Regressions Explaining Change in Value-Added Share of Sectors

Economy	Period	W_B	W_E	V_B	V_E
Hong Kong	1973-80	-	+	-	+
	1980-88	+	+	+	+
	1973-88	-	+	-	+
Japan	1953-63	-	-	-	-
	1963-73	+	+	+	+
	1973-80	-	+	-	+
	1980-89	+	+	+	+
Korea, Republic of	1968-73	-	-	-	+
	1973-80	-**	-	-***	-*
	1980-88	-	-	-**	-
	1973-88	-	-	-***	-**
Singapore	1969-73	-	-	-	+
	1980-89	+	+**	+	+*
	1973-89	+	+	+	+*
Taiwan	1966-86	-	-	-	-

Notes: + and - signs are sign of coefficients.
*Significant at the 0.10 level, ** Significant at the 0.05 level, *** Significant at the 0.01 level. Signs without stars are not significant even at the 10 per cent level.

$W_{B(E)}$ = Wage per employee at the beginning (end) of the period. $V_{B(E)}$ = Value-added per worker at the beginning (end) of the period.

Source: Pack (1993, as cited in World Bank 1993, p. 332).

Table 3.3 Long Term TFP Growth Rates by Sector

Sector	TFP Growth Rates		
	Korea	Japan 1960-79	Taiwan, China 1966-86
Food	7.30	-1.76	2.0[a]
Beverages	7.90	0.0	-
Tobacco	13.40	-	-
Apparel	-	1.98	10.5
Textiles	10.70	0.47	7.6
Leather	12.60	1.03	-
Shoes	-	1.03	-
Wood	9.40	2.81	0.3[b]
Furniture	12.10	1.74	-
Paper	8.20	1.44	2.3[c]
Printing	10.70	-0.18	-
Chemicals	13.10	3.36	3.3
Petroleum	-0.30	-3.55[d]	0.0[b]
Rubber	11.40	1.02	6.3[b]
Non metallic minerals	2.80	-	2.4
Basic metals	-	-	7.2
Iron and Steel	3.70	1.34	-
Metal products	7.60	3.41	4.4
Nonelectrical machinery	8.00	2.30	6.7[e]
Electrical machinery	10.70	5.37	-
Electrical equipment	-	-	7.1
Transport equipment	11.20	4.32	2.7
Precision instruments	-	-	11.0
Plastic products	-	0.92[f]	0.0
Other manufacturing	7.50	-1.76	-
Average	8.8	1.2	4.6

Notes: - Not available.

a. Food and beverages
b. Rubber, petroleum, and wood products
c. Paper and paper products
d. Petroleum ref. and coal
e. All machinery
f. Plastic

Time period for Korea is not indicated in the table. However, according to the information in page 315 the time period is 1966-1985.

Source: Pack (1993, as cited in World Bank 1993, p. 307).

government intervention, since the Korean government shifted its policies dramatically after 1980.

Similarly, the second test, which was based on wages and value-added per worker, made inferences by taking into account structural change over various periods. As can be seen in Table 3.2, of the five countries observed, statistically significant results (even at the 10 per cent level) were reported only in two countries. Of these two, the Korean results were inconsistent with successful selective promotion while Singapore were consistent with the findings.[6] However, the results were generalised focusing more on the Korean than the Singaporean experience. Also, with the data in Table 3.3, one cannot find strong evidence to justify the EAM report's arguments that selective promotion is ineffective. In fact, a number of promoted sectors (for example chemicals, electrical machinery, transport equipment and so forth), achieved quite high TFP growth rates during the observed period (1966-85) in Korea. In the presence of insufficient and sometimes contradictory evidence, however, the EAM study concluded that the manufacturing sectors have evolved roughly in accord with neoclassical expectations and that selective industrial policies are not effective.

In addition to criticisms based on selective evidence, the results of the EAM study on the effectiveness of industrial policies can be questioned on the ground of methodological shortcomings. Firstly, this study considered capital and technology intensive industries as promoted industries and the rest of the industries as non-promoted industries, and for each of the various periods studied, without presenting supplementary information for justifying this classification. Industrial policies, as we noted in Chapter 2, are not only diverse from country to country but also vary within a given country over the time, depending on factors such as status of development, resource endowment, objectives of industrial policies and social, economic and political background. These diversities may have a considerable impact on the selection of industries for promotion. As Perkins (1994) noted, despite its frequent mention of the diversities of the countries under observation, the EAM report

[6] For more details see Yanagihara (1994, p. 667).

generalized the results by assuming that all the sample countries selected industries on a similar basis.

Secondly, the indicators applied (the international norm based on value-added, changes in sectoral shares of value-added and changes in the growth rates of total factor productivity) have their own limitations for making inferences, either about market conforming or industrial policies. On the one hand, it is impossible to attribute performance in relation to any of these indicators directly to market forces or to interventionist policy without an explicit analysis, since performance in relation to these indicators is influenced by a host of both internal and external factors. On the other hand, these indicators also have limited value for making such inferences due to certain methodological shortcomings. These shortcomings are prominent in two of its empirical tests. For its first test, for instance, the EAM report applied the results of the Syrquin and Chenery equation as standard norms, based on averages across many middle income countries, to determine whether the sectoral composition of output was consistent with market forces or government efforts. Given data constraints, comparing the performance of the East Asian countries with standards established for other developing countries with similar characteristics, would be useful to assess the distinctiveness of sectoral composition of output, and to judge the success of policy initiatives. However, the sample of countries used to generate these norms included many which did adopt interventionist policies, such as India, Brazil and Argentina. The norms based on such a sample cannot be taken as the purely endowment driven baseline as the EAM report assumed (Wade 1994; Agrawal et al. 1996).

Moreover, as Yanagihara pointed out:

> the Chenery equation may be understood to reflect a market conforming evolution *a la* quasi-dynamic version of the Hecksher-Ohlin model and deviations from the Chenery regression line may signify static Hecksher-Ohlin model predictions as well as influences of policy, past and present, among other country specific factors. In theory, and to the extent that the above presumption holds, the ratio of the actual to predicted shares could capture relative strengths of market forces and policy influences. But, as EAM admits (p. 327) the nature of the cross economy analysis is too rough to test the statistical significance of deviations from the norm. Estimation of the regression line itself is subject to large margins of error and more fundamentally, its double log specification has no particular theoretical underpinnings. (1994, p. 669)

Likewise, the third test, that based on TFP, by its very nature is vulnerable to criticism on various fronts. As is well known, the results of TFP calculations largely depend on assumptions like competitive markets, constant returns to scale and factors being paid their marginal products, and so forth. In practice, however, it is impossible to satisfy these assumptions. As an alternative, therefore, when estimating production functions, weights are used for estimation. There is ample evidence suggesting that the results of the TFP are highly sensitive to different types of weights, especially to the various levels of the elasticity of substitution. Sheehan (1995) for instance, taking two sample studies, has shown how the measurement of TFP differs when different types of weights are used. Similarly, Rodrik (1997) pointed out that it is impossible to disentangle factor-augmenting technological change from the shape of the production function. Thus, more often by misattributing labour-augmenting technical change to an assumed elasticity of substitution, TFP growth is underestimated.[7] The TFP measures may further vary considerably even among estimates for the same economy and the same industrial sector depending on the estimation technique, as noted above, and the data used – the choice of output (value added vs gross output) and use of capital (capital stock vs flow of capital services) (Kwon 1994a). In addition to these possible measurement errors, Rodrigo (2000) argues that the way technological change is conceptualized does not capture useful information about aggregate technical change, since the growth accounting process overlooks the crucial investments made in individual, organizational and social learning that translate into productivity enhancing human and social capital.

Besides these inherent limitations, the interpretation of TFP results presented in the EAM report has been further questioned on several other grounds. The very basis of the comparison of TFP growth rates across different industries, it is argued, has no theoretical basis. There may well be systematic variation in TFP growth across industries in many countries. As Wade (1994) noted, instead of comparing the TFP results between promoted and non-promoted industries, if the comparison had been

[7] Rodrik (1997) also illustrated how the TFP growth changes with the various levels of elasticity of substitution and particularly he pointed out that the lower the level of elasticity of substitution, the higher the TFP growth rates.

undertaken with the same industry in the rest of the world, the results may have been more sensible and meaningful. Further, factor productivity, or the residual in the production function, may be influenced by many different factors such as better management, economies of scale and higher rates of importation of advanced technology. Based on empirical evidence of TFP estimates of a number of Asian economies, for instance, Dowling and Summers (1997) claimed that estimates of TFP are sensitive to a number of external factors such as the process of technological transfer, the external trading environment, the level of economic growth, and the distortions and biases inherent in the measurement of capital and labour in developing economies.

In addition to the limitations discussed above, the findings of this study were largely confined to limited aspects, primarily on the changes in industrial structure, ignoring most other important contributions such as the contribution of exports. As latecomers, East Asian countries placed heavy emphasis on increasing exports as a method of solving the balance of payments problem and of generating knowledge and experience through their industrial policies. There is ample evidence to suggest (Rodrik 1994; Agrawal et al. 1996; Lall 1994; Wade 1994) that export promotion was one of the goals towards which several instruments – in particular, credit and fiscal incentives were allocated on the basis of export performance – were employed. Studies such as Sheehan and Tikhomirova (1996, p. 13) have shown that the overall growth in merchandise exports, especially in technology intensive sectors, was higher in both East Asia and ASEAN countries compared to other countries in the world, over the period of 1980-1994. They also demonstrated that, in terms of the index of specialisation of high tech exports and the index of knowledge composition of exports, East Asian economies have a proven record of success. In the light of this evidence, one can speculate that there might be some association between this superior performance in exports and technology and industrial policies. Therefore, the EAM report would have been more meaningful if it had incorporated the overriding policy objectives of these countries, such as increasing exports.[8]

[8] Though the EAM report pointed out that in terms of exports East Asian countries were successful, tests for the effectiveness of industrial policy were not developed in terms of exports.

3.2.2 Effectiveness of Industrial Policies: Country-Specific Studies

The effectiveness of industrial policies has also been examined using a wide range of indicators on a country-specific basis. A number of these studies will be discussed in the current section under two broad headings: (i) the effectiveness of industrial policies in terms of exports and (ii) the effectiveness of industrial policies using other aggregate measures.

(i) Effectiveness of Industrial Policies in Terms of Exports

Recent studies by Warr (1995) and Agrawal et al. (1996) have examined the effects of industrial policies in terms of exports, on a country-specific basis. Using net export performance as an indicator Warr (1995) analysed the impact of industrial policies, based on the experience of Thailand during the period of 1974-89. The main objective of this study was to find out whether industrial policies contributed to export success in Thailand. For this purpose, a measure based on the earlier work of Balassa and others on 'revealed' comparative advantage, and known as the net export performance ratio (NEPR) was formed as follows:

$$N_j^T = \frac{(X_j^T - M_j^T)/X_j^W}{X_*^T / X_*^W} \tag{4}$$

where N_j^T denotes Thailand's NEPR for industry j. X_j^T and M_j^T denote Thailand's gross exports and gross imports of commodity j, respectively, X_j^W denotes world exports of commodity j, X_*^T denotes Thailand's total exports of all goods and X_*^W denotes total world exports of all goods. This index thus measures the degree to which Thailand's net exports of commodity j, as a share of world exports of that commodity, exceed or fall short of Thailand's share of world exports in general (Warr 1995, p. 18).

Using a direct approach this study investigated the correlation between net export performance of industries (including agriculture) and several industrial policy instruments namely, the effective rate of protection (ERP), the industry share of

Industrial Finance Corporation of Thailand (IFCT) approved loans, the industry share of total Board of Investment promoted projects, the industry share of total tax drawbacks of funds and industry share of total tax rebate funds. Except for the ERP, all other four instruments were divided by value-added, to allow for the different sizes of the industry. To examine the correlation this study use average sectoral net export performance ratio data for four periods including the periods of 1970-74, 1975-79, 1980-84 and 1985-89 and the average sectoral level of industry policy instruments as a share of value-added for different period intervals depending on the availability of data. As can be seen from Table 3.4, for instance the effective rate of protection is represented by three different years as 1974, 1984 and 1987, whereas IFCT loans are represented by the data for the intervals 1960-79, 1980-85 and 1986-90. Having examined the correlation between net export performance and different industry policy instruments, this study concluded that export performance was negatively related to all five measures, over time (see Table 3.4). Interpreting these results, Warr suggested that this may be due to the promotion of poor performers by using industrial policy instruments.

Table 3.4 Thailand: Correlation Coefficients Across Industries – Trade Performance and Policy

NEPR	Effective Rate of Protection			IFCT Loans			BOI Projects		Tax Draw-backs	Tax Rebates
	1974	1984	1987	1960-79	1980-85	1986-90	1983-85	1987-89	1986-89	1986-89
1970-74	-0.06	-0.02	-0.08	-0.16	-0.03	-0.02	-0.24	-0.39	-0.16	-0.46
1975-79	-0.07	-0.11	-0.14	-0.18	-0.09	-0.08	-0.26	-0.47	-0.12	-0.39
1980-84	-0.06	-0.16	-0.15	-0.16	-0.11	-0.11	-0.23	-0.52	-0.11	-0.40
1985-89	-0.04	-0.14	-0.15	-0.17	-0.15	-0.25	-0.28	-0.52	-0.03	-0.35

Source: Warr (1995, p. 21).

This analysis appears to be significant on several grounds. Firstly, it assessed the impact of industrial policies by using direct measurements: the correlation between net export performance and industrial policy instruments. Secondly, the instruments contained in this study covered overall aspects of industrial policies such as foreign investment, tax incentives and protection thus incorporating country-specific and other diverse characteristics of industrial policies. In that respect, this

study shed lights on the incidence and diversity of industrial policies and their implications. Despite these positive remarks, the conclusions derived through this study have to be taken with care, for a number of reasons. First of all, though export performance would be an appropriate indicator for gauging the effectiveness of industrial policies in the case of Thailand, since it has placed considerable emphasis on promoting exports through industrial policies since early 1970s, the indicators applied in this study may not be suitable for making inferences on the effectiveness of industrial policies for several reasons. On the one hand, Thailand like other developing countries, depends on imported raw materials and machinery, and it is a relatively new comer in the industrialization field. Against this background, one cannot expect improvement in their trade balances or competitive advantage within a short period of time. On the other hand, just because there is a negative correlation between aggregate sectoral net export performance ratios and industrial policy instruments, such evidence is not sufficient to generalise the results as implying an ineffective outcome of policy instruments without examining other objectives, such as promoting value-added, industrial and economic growth.

Thirdly, it is doubtful whether certain industrial policy instruments, for example, BOI projects, tax drawbacks and rebates implemented in the 1980s, should be expected to have any impact on the net export performance of industries, particularly during the early periods such as 1970-74, and 1975-79. Fourthly, due to the aggregate nature of the presentation – correlations between averages of each industry instruments and net export performance over five year periods – one cannot get a clear idea about the contribution of each individual industrial sector.

Taking export performance as an indicator, Agrawal et al. (1996) also studied the impact of industrial policies at both aggregate and commodity levels for different policy regimes, for a sample of four countries including the Republic of Korea, Taiwan, Malaysia and India. This study contained two segments. In its first segment, it discussed three instruments of selective intervention including: (i) the provision of virtually a free trade regime in terms of the input requirements for the promoted industries; (ii) the provision of subsidized credit and (iii) the provision of fiscal incentives (Agrawal et al. 1996, p. 4.6). The outcome of these instruments and

selective policies were then examined using some aggregate measures such as comparing average annual growth of GDP, total exports manufacturing output as a share of GDP and so on. In addition to that, the costs of selective intervention were also examined by applying indicators such as balance of payments problems arising from trade discrimination, the monetary effects of financial repression and the consequent expansion of credit, and the fiscal effects of subsidies and tax concessions. The second segment of this study explored the institutional aspects. It mainly discussed the nature of the constraints imposed on various producers to achieve efficiency and how these constraints affected the behaviour of both policy makers and producers.

Primarily based on aggregate quantitative evidence (secondary data extracted from various studies) for different policy periods, Agrawal et al. reported that although industrial policies created a positive impact in terms of exports, there is a mixed record of success for selective policies. Yet again, these findings have to be taken with care, due to a number of reasons. Firstly, the conclusions on the effectiveness of industrial policies are derived in this study on the basis of indirect evidences. As can be seen from Table 1 and 2 of Appendix 3.1, in the case of Korea, the effectiveness of industrial policies are examined through aggregate measures such as average annual GDP and manufacturing output as a share of GDP and so on for four different policy periods. Such aggregate performance measures cannot be purely attributed as a policy outcome without carrying out an explicit analysis. Secondly, though this study mentioned three selective policy instruments, no explicit attempts has been taken by this study for identifying the potential impact of these policy instruments on outcomes other than listing of the trade and credit policy indicators as shown in Table 3 in Appendix 3.1. Overall, the quantitative indicators applied in this study are not only indirect but also inadequate to reveal the potential outcome of industrial policies in the sample countries.

(ii) Effectiveness of Industrial Policies: Using Other Aggregate Measures

In addition to the studies mentioned earlier, several other studies have analysed the effectiveness of industrial policies on a country-specific basis, by using a variety of indicators. A number of these studies, such as Dollar and Sokoloff (1994), Stern (1990), Lee (1996), Hill (1997) and Cho and Kim (1995), are most notable for their theoretical and empirical contributions.

Dollar and Sokoloff (1994) analysed industrial performance in Korea and Taiwan using several indicators such as growth of value-added, labour productivity and exports of the manufacturing sector. In this analysis they characterised "industrial targeting" as those policies that focus on the end result of industrialization – structural change – and encouraged the growth of particular industries. Within this specification, import protection, subsidized credit and public investment initiatives that are targeted to specific industries are considered as examples of industrial targeting. Under this framework, the basic objective of their study was to examine whether there were substantial differences in performance between targeted industries and other industries in generating economic growth in the sample countries. In this process they have compared the industrial performance of heavy and light industries in Korea and Taiwan, using labour productivity and value-added growth over the period 1961-79. With these analyses this study concludes that industry specific interventions have not been an important cause of growth in either economy.

Applying the economic rate of return and opportunity cost of capital as indicators, Stern (1990) made an effort to measure the success of industrial policies by taking eight heavy and chemical industries, in which such policies were applied, as a sample for the case of Korea. For analytical purposes, industries have been classified into two groups, as successful and unsuccessful. If the economic rate of return is higher than the opportunity cost of capital, those industries were classified as successful. If the economic rate of return is lower than the opportunity cost of capital, such industries were classified as unsuccessful industries. On the basis of these criteria, the study concluded that five out of eight sample industries selected are successful and industrial policies played a part in achieving this outcome.

Commenting on three unsuccessful industries, Stern (1990) pointed out that certain exogenous factors such as shift in prices and decline in demand has largely influenced those industries and therefore cannot be solely interpreted as a policy outcome. He further added that the success of some of the heavy industries in Korea is at least partly due to exogenous changes (easy access to US markets) and other favourable factors such as the presence of a strong infrastructure, an educated and disciplined labour force and experienced entrepreneurs, and therefore cannot be entirely viewed as a result of Korea's industrial policy.

In effect, both these studies (Dollar and Sokoloff 1994 and Stern 1990) have made a valuable contribution to the empirical literature in assessing the effectiveness of industrial policies. The former based its conclusions on three different indicators while extending its empirical analysis to the sectoral level. Departing from common approaches, the latter study has assessed whether industry specific intervention was successful or not, taking the economic rate of return and the opportunity cost as measurement criteria. The analytical approach of Stern (1990) is particularly noteworthy, because it viewed the success or failure of policy outcome in a broad perspective, considering how both internal and external factors determined the outcome of policies.

In one of the most significant studies to date, Lee (1996) investigated the association between direct measures of government intervention and total factor productivity for Korea at the sectoral level between 1963-83. In this study Lee illustrated how to incorporate policy intervention into a growth accounting framework, as outlined below.

The theoretical approach begins with a constant-returns-to scale production function of value-added in sector i :

$$Q_i = F(A_i, K_i, H_i, L_i), \quad i = 1...N, \tag{5}$$

where Q_i, K_i, H_i, and L_i, represent the quantities of value-added, physical capital, human capital and raw labour input used in the production of good i respectively. The

level of technology in the sector i is denoted by A_i. Simplifying the production function in terms of ratios per unit of labour input:

$$q_i = f(A_i, k_i, h_i), \qquad i=1.....N, \tag{6}$$

where q_i ($=Y_i/L_i$) denotes labour productivity, k_i ($=K_i/L_i$) denotes capital intensity of industry i and h_i ($=H_i/L_i$) denotes the level of human capital stock, all per unit of labour input.

Following the conventional growth accounting framework introduced by Solow and developed by Denison and others, the growth rate of value-added in sector i is decomposed into the contribution of the increase in factor inputs plus a residual. Applying this to the equation (6) yields a form of growth accounting:

$$\dot{q}_i/q_i = \dot{A}_i/A_i + \alpha_K \dot{k}_i/k_i + \alpha_H \dot{h}_i/h_i , \tag{7}$$

where the parameter α_k and α_H denote the elasticity of output with respect to physical and human capital respectively. Equation (7) thus decomposes labour productivity growth into a weighted sum of growth in neutral technological progress and in physical and human capital stock. However, considering the data limitations on human capital stock, equation (7) is modified to:

$$\dot{q}_i/q_i = \alpha_K \dot{k}_i/k_i + \dot{TFP}_i/TFP_i \tag{8}$$

where the sum of $\dot{A}_i/A_i$ and $\alpha_H \dot{h}_i/h_i$ is put into a residual, which is typically referred to as the growth rate of total factor productivity (TFP).

In the simple Solow-type neoclassical growth model technological progress is assumed to be exogenous. In this model, the rate of technological change determines the rate of the steady state growth in per capita GDP. But economies may also be at

times far from the steady state path so that actual growth rates may involve catch-up to that path.

> The growth rate of output per worker may be a result of two sets of variables: first, initial levels of state variables, such as the stock of physical capital and the stock of human capital; and second, control or policy variables, which are considered to influence the steady-state level of per worker output and thus change the growth rate over the transitional interval. (Lee 1996, p. 397)

Lee argued that a similar framework can be applied to explaining growth of sectoral capital and output, especially in the case of Korean manufacturing industries, since they had initial output and capital stocks that were far away from the steady-state ones. The growth rates of sectoral output and capital stocks are influenced by the initial level of the capital stocks. Government policies such as industrial and trade policies may affect the growth rate of capital stocks and output by influencing both the steady-state level of capital stocks and the speed of accumulation. Incorporating policy variables, for empirical purposes, the equation (8) is specified as follows:

$$Y_{it} = \beta_{it} + \gamma X_{it} + \phi Z_{it} + U_{it}, \quad i=1...N, \quad t=1,.....T \tag{9}$$

Here, the dependent variable Y_{it} represents either labour productivity growth $\left(\dot{q}_i/q_i\right)$ or one of its components, growth of capital stock $\left(\dot{k}_i/k_i\right)$ or growth of TFP $\left(\dot{k}_i/k_i + \alpha_H \dot{h}_i/h_i\right)$ in each period t.

The vector of independent variables X_{it} include following initial state variables:

$$X_{it} = [\log(q_{it}), \log(k_{it})], \tag{10}$$

where q_{it} is value-added per work hour in the initial year of period t, and k_{it} is capital stock per work hour in the initial year of period t. Since data on human capital h are not available, $\log(k_{it})$ and $\log(q_{it})$ are included assuming that these variables would capture the effects of initial differences of capital stocks and output per worker across industries on the consequent sectoral productivity growth.

The vector Z_{it} denotes a set of government policy variables and they include following variables.

$$Z_{it} = [NTB_{it}, TARIFF_{it}, TAXINC_{it}, CREDIT_{it}], \quad (11)$$

where NTB_{it}, $TARIFF_{it}$, $TAXINC_{it}$, and $CREDIT_{it}$ represent a measure of non-tariff barriers, an average tariff rate, an estimate of tax incentives, and an estimate of financial incentives that were provided for the industry *i* respectively. The first two policy measures, according to this study, were classified as trade policy measures while including the latter two as industrial policy measures. As Lee pointed out, correlation between policy variables and output growth could come from two effects: First, the government policy may influence capital accumulation and thus output growth. Second, the government policy could affect the output growth by influencing TFP growth (p.399).

Further, by assuming industry and time specific fixed effects, the intercept is specified as follows:

$$\beta_{it} = \bar{\beta} + \mu_i + \lambda_t. \quad (12)$$

As stated:

> the industry and time specific constant terms may capture unmeasured disturbances to growth of capital stocks or of productivity. The industry intercept μ_i is likely to capture unmeasurable industry-specific elements, such as the share of trade and the geographical location of each industry. And the time intercept λ_t may reflect technological progress common to all industries and period specific disturbances such as oil shocks in the 1970s. (Lee 1996, p. 398)

The impact of government policies was evaluated in this study by estimating equation (9) using panel data and the weighted least squares (WLS) technique, which corrects for cross equation heteroscedasticity.

Equations were estimated for both the growth rate of sectoral value-added and of its components – the growth rates of capital stock and of total factor productivity.

The regression results revealed that there was a strong negative effect of trade protection, a positive effect of tax incentives and no significant effect of financial incentives on the growth rate of value-added per worker (see Table 3.5). Investigating the association of these industrial policy instruments separately with growth rate of capital stock and the growth of TFP, this study further reported that tax incentives affect the accumulation of physical capital (positive effect) but not TFP growth. Trade protection, however, has a significant negative effect on both capital accumulation and TFP growth. Financial incentives had no significant effect either on capital accumulation or TFP growth (see Tables 3.6 and 3.7).

Overall, this study concluded that tax incentives positively affect output growth rates by stimulating capital accumulation, but not by affecting TFP growth, whereas trade (protection) policies decrease the growth rates of output by decreasing both the TFP and the accumulation of physical capital. Further, it found that Korean industrial policies (particularly tax incentives) though helped the structural transformation of the economy, they have not been successful in promoting productivity growth.

In effect, this empirical analysis has also made a valuable contribution: it presented a theoretical approach incorporating the role of policy intervention in the analysis; it used a direct approach in assessing the impact of government intervention by using specific intervention measures; and it employed the three-digit level ISIC classification.

Above all, this study is particularly noteworthy for its explicit attempts to examine the association between industrial performance and incidence measures. Despite these positive attributes, there are a number of points which deserve attention. Firstly, industrial policies are perceived differently in this study. Of the four policy

Table 3.5 Panel Regressions for Growth Rate of Value-Added Per Worker[a]

Independent Variable[b]	Coefficient (Standard Errors)			
	(4.1)	(4.2)	(4.3)	(4.4)
Log (Initial Value-Added)	-0.092	-0.109	-0.112	-0.163
	(0.017)	(0.014)	(0.019)	(0.014)
Log (Initial Capital)	-0.050	0.094	-0.049	0.172
	(0.019)	(0.024)	(0.023)	(0.024)
Non-tariff Barrier	-0.144	-0.058	-0.251	-0.092
	(0.037)	(0.033)	(0.040)	(0.030)
Tariff	-0.035	-0.082	-0.111	-0.118
	(0.081)	(0.067)	(0.061)	(0.039)
Tax Incentives	0.239	0.011	0..312	-0.099
	(0.133)	(0.119)	(0.140)	(0.111)
Bank Loans	-0.083	-0.011	-0.110	-0.084
	(0.164)	(0.139)	(0.232)	(0.169)
Growth Rate of Capital Stock		0.693		0.990
		(0.086)		(0.092)
Estimation Technique[c]	WLS	WLS	3SLS	3SLS
Number of Observations	146	146	146	146

Notes: a. The dependent variable is the annual growth rate of real value-added per hour over each five-year period (1963-1968, 1968-1973, 1973-1978, 1978-1983) from 1963 to 1983. There are 146 observations (thirty-eight industries and four time periods; two missing industries for three periods).

b. The independent variables are as follows: *Initial Value-Added* is real value- added per hour in the initial year of each period; *Initial Capital* is real value of net capital stock per hour in the initial year of each period; *Non-tariff Barrier* is the ratio of tariff subject to discretionary import approval to the total number of items in the mid year of each period; *Tariff* is the output weighted average of legal tariff rate in the mid year of each period; Tax incentive is the period average of ratio of difference between legal and effective marginal corporate tax rate; *Bank Loans* is the period average of ratio of subsidized bank loans to total assets; *Growth Rate of Capital Stock* is the annual growth rate of capital stock per hour over each period.

c. The weighted least squares (WLS) technique corrects for the cross equation heteroscedasticity. The three stage least squares (3SLS) technique uses log values of initial value-added and capital and one period lagged policy variables as instruments. Industry and period specific effects are controlled.

Source: Lee (1996, p. 400).

Table 3.6 Panel Regressions for Growth Rate of Capital Stock[a]

Independent Variable[b]	Coefficient (Standard Errors) (5.1)	(5.2)
Log (Initial Value –Added)	0.035	0.025
	(0.013)	(0.014)
Log (Initial Capital)	-0.195	-0.209
	(0.015)	(0.017)
Non-tariff Barrier	-0.131	-0.159
	(0.028)	((0.028)
Tariff	0.056	-0.029
	(0.062)	(0.038)
Tax Incentive	0.382	0.499
	(0.122)	(0.105)
Bank Loans	-0.188	-0.019
	(0.138)	(0.200)
Estimation Technique[c]	WLS	3SLS
Number of Observations	146	146

Notes: a. The dependent variable is the annual growth rate of net capital stock per hour over each five-year period (1963-1968, 1968-1973, 1973-1978, 1978-1983) from 1963 to 1983.
b. See note b to Table 3.5.
c. See note c to Table 3.5.

Source: Lee (1996, p. 401).

Table 3.7 Panel Regressions for Growth Rate of Total Factor Productivity[a]

Independent Variable[b]	Coefficient (Standard Errors) (5.1)	(5.2)
Log (Initial Value-Added)	-0.144	-0.153
	(0.146)	(0.015)
Log (Initial Capital)	0.071	0.078
	(0.017)	(0.018)
Non-tariff Barrier	-0.072	-0.167
	(0.032)	((0.033)
Tariff	-0.079	-0.113
	(0.069)	(0.048)
Tax Incentive	0.044	0.074
	(0.110)	(0.113)
Bank Loans	-0.019	-0.123
	(0.138)	(0.181)
Estimation Technique[c]	WLS	3SLS
Number of Observations	146	146

Notes: a. The dependent variable is the annual growth rate of total factor productivity over each five-year period (1963-1968, 1968-1973, 1973-1978, 1978-1983) from 1963 to 1983. It is derived from the growth accounting of value added.
b. See note b to Table 3.5.
c. See note c to Table 3.5.

Source: Lee (1996, p. 401).

variables applied, this study considered two variables namely, tax and financial incentives as industrial policy instruments. In fact, trade policies also play an important role in promoting industries, in particular infant industries in Korea. When all the policy variables are taken together it is fair to conclude that industrial policy instruments generate mixed results for promoting productivity growth in Korea. Secondly, TFP as a measurement indicator, has been subjected to criticism due to possible measurement errors.

In investigating industrial policy and performance in Chapter 12, Hill (1997) also focused on industrial policy instruments. Those policy instruments that were identified as the instruments of selective industrial policies included: (a) control over the formal capital market, both in terms of the rates set and of the allocation of funds between industries; (b) trade and protection policy; (c) the fiscal regime employed, ranging from extensive direct investment to fiscal incentives and (d) other additional instruments, including a highly selective foreign investment regime, specific measures to encourage industrial agglomeration and industry associations, labour market restrictions and training, and support initiatives. The main question which the empirical analysis seeks to answer was whether the rapid industrial growth of Indonesia could be attributed to selective industrial policy. Having examined key instruments of selective industrial policies of Indonesia descriptively, and analysing the correlation between effective rate of protection – represented by data for years 1987 and 1990 – and several aggregate measures such as the real output growth, exports and the TFP in the manufacturing sector, Hill concluded that those instruments have made very little contribution to the industrial and export success.

Some explanation is warranted regarding these empirical results. Firstly, of the instruments mentioned above, he included only one instrument, protection, in his quantitative analysis. The conclusions in respect of the other instruments were based on descriptive analysis. In relation to protection, this study used the effective rate of protection (ERP) for 1987 and 1990. The correlation between this measure and several other variables (such as the real output growth, exports and the TFP) across industries was examined. The ERP data for 1987 and for 1990 was correlated with the growth of manufacturing output for the period 1980-90, the percentage increase in

the index of export specialization, and the annual growth in TFP for the period 1982-91, respectively. It was hypothesized that for industrial policy to have been successful, protection and the growth in all three variables noted above would be positively correlated. The results indicated that none of the correlations was statistically significant, and only the correlation between TFP growth and ERP has the expected sign for both periods under observation (see Table 3.8). As a supplement, however, this study discussed the level of protection and their outcomes in some key industries including steel, plywood, garment and weaving. On the grounds of this evidence, this study concluded that there is little support for selective industrial policy through protection.

Although these findings are generally consistent with the other studies (for example Lee 1996 and Kwak 1994), the central question is to what extent the correlation coefficient figures presented between the ERP in the year of 1987 or 1990, and the other variables which use average growth figures broadly between 1980-90, are reliable. According to the author, the figures for ERP reflect the effects of protective regime over the 1980s, since no major reforms had been undertaken during the period observed.

Table 3.8 Correlation Coefficients: Effective Protection and Industry Performance

Variable	ERP 1987	ERP 1990
Output	0.017	-0.032
Exports	-0.046	-0.088
TFP	0.073	0.064

Notes: ERP= Effective rate of protection.

None of the correlations is significant (with ERP) at the 10% level.

Source: Hill (1997, p. 308).

In the presence of contradictory evidence, however, the validity of this assertion may be questioned. As the author himself pointed out elsewhere, there have

been inter-industry variations over time in the level of protection in Indonesia. As he stated: "there has indeed been significant reform of Indonesia's trade regime. For example, average tariff rates declined significantly over the period 'pre-1985' (that is before the reforms had commenced) to mid 1992, from 37% to 20% and 29% to 13% on an unweighted and weighted basis respectively" (p. 351). Similar evidence is presented in APEC (1995b). Indeed the data (in Table C.4, p. 142) showed that there was substantial variation in the level of tariff and non-tariff barriers during the observed period. For example, mean tariff rates (unweighted averages) were 31.3, 19.4 and 22.5 in the periods of 1980-83, 1984-87 and 1988-90 respectively. In light of this evidence, the simplification used and therefore conclusion derived from it, have to be taken with care.

Cho and Kim (1995), in another country-specific study, examined the effectiveness of credit policies, one of the most popular industrial policy instruments, in Korea. This study covered various aspects of credit policies, while stressing the importance of credit policy as an instrument of corporate governance and risk management. Also it discussed the cost and legacy of credit policies, particularly the resulting effect of contributing to an inefficient banking system and economic concentration. In analysing the effectiveness of credit policies this study mainly focused on two themes: the contribution of credit policies to the growth of industries by easing access to subsidies and capital, and their impact as an instrument of industrial policy in securing private sector compliance with government policy goals. To assess these themes, this study firstly explored whether these policies did indeed increase access to, and reduce the cost of capital for, the targeted sectors. For this, it compared the access to credit (defined as consisting of total bank loans and foreign loans[9] divided by the total assets of each sector) and the average cost of borrowing across policy favoured and non-policy favoured sectors during 1973-90. Policy favoured sectors consisted of export promoting, heavy and chemical and large-scale industries whereas non-policy favoured sectors included domestic, small-scale and light industrial sectors. On the basis of this evidence, the study found that during the

[9] Foreign loans were also considered as policy directed finance facilities.

observed period, policy-favoured sectors had both greater access to capital and a lower cost of borrowing than non-favoured sectors (see Appendix 3.2 Table 1).

Secondly, this study examined whether credit support spurred the growth of the policy favoured sectors. To address this issue, it employed three indirect measures, the impact of credit support on: (a) the take-off of exports; (b) on the rapid growth of HCIs in the 1970s; and (c) the development of an infant industry (the steel industry by using Pohang Iron and Steel Company (POSCO) as a case study). Analysing the growth of exports and the amount of financial subsidies for exports for the period 1965-1990, this study reported that though the amount of credit subsidies was comparatively high, no apparent contribution to the take off of exports from credit support could be observed. Comparing the composition of bank loans with the changes in industrial structure and composition of exports by the HCI sector with that of light industrial sector during the period 1970-88, this study concluded that:

> the expansion of HCI in the 1970s is striking. Within a decade, its share of total industrial output grew more than two and half times, and its share in exports tripled. It is obvious that without government intervention in the allocation of credit, quick transformation of the industrial composition, and a discrete jump in the level of industrial development, would not have been possible. (p. 56)

Finally, confirming positive effects in relation to the steel industry, it was further declared that "government led financial support was the most critical source of funds for the successful transformation of POSCO, into one of the world's most efficient steel producers" (p. 59).

Overall, this study provides a comprehensive picture of credit policies, their effects and consequences, thus covering a wide spectrum which may be useful in a number of respects. Firstly, departing from the popular classification of industries this study used a broad, but sensible classification for identifying policy favoured and non favoured sectors, which were mainly based on the access to credits and the cost of the credit. Secondly, industrial performance was analysed on the basis of the stages of industrialization, which might have significant impact on the policy outcome. However, the aggregate measures applied in this study (growth of exports, changes in industrial structure and so on) have limited value for evaluating the effectiveness of

credit policies, since the performance of aggregate measures could be influenced by a host of other factors.

3.3 Common Limitations

Owing to the differences in coverage, methodology, concepts and data, direct comparison of the studies outlined above is not possible. However, a number of points which deserve attention will be noted in this section. As is clear from the previous discussion, the existing analyses of the effectiveness of industrial policies show inconsistent results. In part, these inconsistencies could be attributed to the methodological differences evident in these studies in terms of the nature and scope of the studies, and to the lack of a uniform conceptual mechanism.

The nature of the study (the basis which the studies are carried out, for example, country-specific or cross-country) will be a significant influence on its outcome. Naturally, the outcome of a cross-country study may differ from that of a country-specific study, even if the same technique is applied. As was clear, all of the comprehensive studies outlined above except the EAM report are not only country-specific studies but also apply a variety of techniques. In addition, the scope of the studies vary considerably. For example, the EAM study argued that industrial policies, in particular selective promotion, are ineffective on the basis of changes in industrial structure and productivity. Somewhat similar conclusions are found in Warr (1995) and Hill (1997), on the grounds of exports and other aggregate measures. On the contrary, Cho and Kim (1995) and Agrawal et al. (1996) declared that industrial policies are effective in terms of their effect on exports but used different indicators as well as different methodologies.

The lack of a uniform conceptual framework regarding industrial policies in general, and more importantly regarding industry specific intervention, has been another factor that contributed to the mixed results. For instance, the absence of uniformity with reference to the coverage of industry specific intervention can be observed clearly with the following examples. The EAM report (p. 88) provides a relatively broad definition of selective intervention including four types of policies

under this category: (i) export push; (ii) financial repression; (iii) directed credit; and (iv) selective promotion. Hill (1997) identifies a list of instruments of selective industrial policies including: (a) control over the formal capital market both in the rates set and in the allocation of funds between industries; (b) trade and protection policy; and (c) the fiscal regime employed ranging from extensive direct investment to fiscal incentives and so forth. Lee (1996) considers tax and financial incentives as industrial policy instruments excluding tariff and non-tariff measures whereas Warr (1995) includes foreign direct investment and the effective rate of protection as industrial policy instruments in addition to the variables representing tax and financial incentives. With different interpretations and different instruments one can inevitably expect different outcomes.

All in all, with differences noted above, it is not surprising to find inconsistent results. Although these results might be taken as having an important message – that industrial policies work well in certain circumstances and in certain other circumstances do not produce the expected results – almost all the studies generalise their results in terms of the effectiveness or ineffectiveness of industrial policies.

These interpretations can be questioned on several grounds. The analytical techniques applied by the majority of the existing empirical studies have limited value for making inferences about the effectiveness of policies, for a number of reasons. Firstly, all of the empirical studies noted previously, except Warr (1995) and Lee (1996), base their conclusions on analysis of factors such as the aggregate performance of exports, economic growth and value-added. Such aggregate performance could be influenced by several other internal and external factors. Therefore, the outcome of these variables cannot be solely attributed to the industrial policies, without an explicit analysis which takes account of the other possible factors determining these outcomes.

Secondly, no systematic and logical basis has been evident for identifying selectively promoted industries in these empirical studies. To determine the effectiveness of industrial policies, in particular industry specific intervention, it is required to identify industries that have been preferred over the others. However,

without providing any logical basis, almost all the studies (except Cho and Kim) classify industries as promoted and non-promoted industries on the basis of including heavy and chemical industries on the former and other industries to the latter.

As mentioned in Chapter 2, industry-specific intervention is rarely practiced uniformly among countries. Due to the various country-specific factors - such as natural resource endowment, political economy, status of development, policy priorities and so forth – industries that have been subject to preferential treatments differ between countries and also over time. Both Malaysia and Thailand, as natural resource rich countries, emphasised promotion of resource-based industries, while also promoting labour intensive industries. In addition, developing countries as latecomers often start their industrialization process by placing emphasis on labour intensive industries while applying various measures to promote other industries. For instance, as Rodrik (1994) pointed out, the textile industry was not only designated as a strategic industry, but also promoted heavily both in Japan and the Republic of Korea in their early development periods. In other words, policy favoured sectors have not been exclusively limited to heavy and chemical industries, even in the case of Korea. Under these diverse circumstances, the generalization of heavy and chemical industries as promoted industries and the others as non-promoted industries, will not be appropriate for all countries at all times.

Therefore, to determine the extent of industry specific intervention, it is necessary to establish some kind of clear conceptual framework. This task would require understanding the incidence of industrial policies – *what industries, at what time, to what extent and using what measures have been subjected to industrial promotion.* Instead of applying such a specific approach, the effects of industrial policies have been evaluated by existing empirical studies while assuming the industrialization process to be a once and for all event.

Summing up, the available empirical studies have derived their conclusions on the basis of the analyses of broad economic aggregates while ignoring the diversity of factors affecting those outcomes, and the diversity of the incidence of industrial policies across nations and industries over time. As a result, the empirical evidence

about the effectiveness of industrial policies remains inconclusive. Inter alia, an appropriate strategy to assess the effectiveness of industrial policies appears to require: (a) developing a logical basis to identify the incidence of industry policies, having regard to the particular characteristics of industrial policies in a given country at a particular time; (b) developing measures to assess the potential outcomes of industrial policies, which take account of the impact of other factors and (c) evaluating the impact of industrial policies with further analysis. While taking into account the specific characteristics of industrial policies (the diversity of instruments and outcomes and the incidence of industrial policies), forthcoming chapters in this study will attempt to develop an alternative method for evaluating the effectiveness of industrial policies.

Appendix 3.1

Table 1 Real GDP and Export, South Korea, 1953-91

	1953-62	1962-71	1971-81	1981-91
Average annual growth				
GDP (%)	3.9	10.4	11.5	9.8
Total exports (%)	16.1	39.3	34.8	12.9
End of period shares (%)				
Manufacturing output/GDP	11.7	21.8	31.3	27.5
Manufacturing exports/Total exports	27.0	86.0	92.9	95.4
Tot export/GNP	2.4	11.6	31.9	25.6

Source: Nam (1993) as cited in Agrawal et al. (1996, p. 4.57).

Table 2 Composition of Manufacturing Output and Exports, South Korea, 1971-83

Year	% of Manufacturing Output		% of Manufacturing Exports	
	Light	Heavy	Light	Heavy
1971	59.5	40.5	86.3	13.7
1974	50.1	49.9	66.8	33.2
1977	49.3	50.7	68.4	31.6
1980	43.7	56.3	60.1	39.9
1983	40.7	59.3	45.7	54.3

Source: Amsden (1989) as cited in Agrawal et al. (1996, p. 4.57).

Table 3 Indicators of Trade and Credit Policy, South Korea, 1965-90

	Trade policy indicators			Interest Rates by Loan Category		
Year	Nominal Exchange Rate (won/US$	Gross Export Subsidies (Per US$)	Import Liberalization Ratio	General	Export	Heavy Industry
1965	265.4	39.2	35.8	26	8	na
1971	347.7	103	55.2	22	6	na
1975	484	81	54.7	15.5	9	12
1977	484	93.1	55.8	16	8	14
1980	618.5	131.6	65.3	20	15	19.5
1983	781.2	na	70.5	10	10	10
1985	870	na	78.7	11.5	10	11.5
1990	707.7	na	87.6	12.5	11.5	10

Source: Kim (1994) and Cho 1995 as cited in Agrawal et al. (1996, p. 4.58).

Appendix 3.2

Table 1 Credit Access and Borrowing Costs by Sector (per cent)

		1973-81	1982-86	1987-90
Access to borrowing (a)				
Manufacturing		40.4	31.5	27.7
Large firms	(A)	40.9	31.6	27.0
SMCs	(B)	32.7	31.3	31.4
(A) -(B)		8.2	0.3	-4.4
Export	(C)	45.1	35.9	30.3
Domestic	(D)	37.6	28.8	26.3
(C)-(D)		7.5	7.1	4.0
HCI	(E)	40.7	32.2	28.2
Light Industry	(F)	39.8	30.3	27.0
(E) -(F)		0.9	1.9	1.2
Average borrowing cost (b)				
Manufacturing		13.3	14.0	13.0
Large firms	(G)	13.0	14.0	12.6
SMCs	(H)	14.9	14.2	14.3
(G) -(H)		-1.9	-0.2	-1.7
Export	(I)	12.6	12.7	12.6
Domestic	(J)	14.0	14.8	13.2
(I)-(J)		-1.4	-2.1	-0.6
HCI	(K)	12.1	13.5	12.7
Light Industry	(L)	14.9	14.9	13.5
(K) - (L)		-2.8	-1.4	-0.8
Memo items: Wholesale, retail, & hotel		17.3	16.9	15.3

Notes: (a) Bank loans and foreign loans/total assets.

(b) Average borrowing cost = financial cost/(corporate bond + foreign loans + loans from the financial institutions).

Source: Bank of Korea, *Financial Statements Analysis*, various issues as cited in Cho and Kim (1995, p. 52).

4. Assessing the Diversity and the Effectiveness of Industrial Policy: Methodology and Scope of the Study

4.1 Introduction

As described in Chapter 1, the various theoretical rationales for industrial policy imply that there can be many different types of policy intervention. Beyond these theoretical considerations, differences in policies applied between countries, and also within a given country over the time, are both possible and likely as noted in Chapter 2. These variations are due to a number of reasons, such as the variety of country-specific factors and dynamic changes arising from economic, political and technological developments. These diversities may have a considerable impact on the outcomes of industrial policies. If the effects of policies are viewed while overlooking the significance of these various forms of diversity, the resulting analysis will not reveal a true picture of the effectiveness of industrial policy. Nevertheless, empirical studies have so far paid little attention to exploring this diversity and its effects. This is clearly evident in the review of empirical studies with regard to the impact of industrial policies undertaken in Chapter 3. In this context, we conclude that to assess the effectiveness of industrial policies appropriately it is important not only to identify the diversities for the country being analysed but also to ensure that this diversity is allowed for in the analytical methodology.

As a first step, this study argues that it is important to examine the incidence of industrial policies. As will be specified later in this chapter, the term 'incidence of industrial policies' refers to the specification of what industries, using what measures, for what purposes, at what time and to what extent have been subjected to industrial promotion. On the basis of this incidence analysis, attempts will be made to identify the industries that have been preferred over the others in a particular setting. Having identified industries according to the magnitude of industrial promotion, as a second step this study will explore the potential outcome of industrial policies of Korea compared to countries with similar characteristics, using value-added and exports as indicators. Since such analyses provide evidence, under the given data constraints,

only of potential outcomes, further analyses need to be undertaken to determine the impact of industrial policies, that is, the extent to which policies with a given incidence actually contributed to these outcomes.

This chapter, outlining the concepts and methodologies to be used in assessing the diversity and the effectiveness of industrial policies, initially reviews, in Section 4.2, the incidence of industrial policies and how it applies in the present study. In Section 4.3, the methodology that will be applied for examining the diversity and measuring the incidence of industrial policies, for assessing potential outcomes and for analysing the impact of industrial policies will be reviewed briefly. Data sources and limitations are discussed in Section 4.4. Finally, the structure of the rest of the thesis will be outlined in section 4.5.

4.2 Incidence of Industrial Policies

The term *incidence* is widely used with reference to taxation and also for policy intervention (protection or promotion). The term *tax incidence* is usually applied to identify who actually bears the burden of the resources transferred to the government by the tax system, and basically refers to the study of the effects of a particular tax or tax system on the distribution of economic welfare. Several approaches, such as analyses of factor groups, labour and capital, and consumption and income groups, are employed to assess taxation incidence. The important lesson provided by this type of analysis is that there is no necessary correlation between the individual who pays the tax and the person who bears the tax burden. In the case of an excise tax, on a single good in a competitive market, for example, the actual burden depends on the relative magnitude of the supply and the demand elasticities.

Likewise, the term *incidence of protection* is used to identify the ultimate bearers of policy intervention. Countries may apply a variety of methods to stimulate or protect industries, including promotional policies such as subsidies and other incentives and protectionist policies such as tariffs and quotas. Typically, these policies are employed without considering their impact on the overall industrial structure or on the economy as a whole. A particular policy measure designed to protect or promote one sector could result in harming another sector. The import

tariff charged on importers, for example, may finally end up being an expense for exporters. Such effects have long been analysed in much the same way as tax incidence.

Engaging in a somewhat related exercise, Balassa (1982, p. 9) noted that one may undertake two distinct tasks in evaluating a system of incentives[1]: gauging the incidence on product prices of the incentive measures applied, and predicting their economic effects. The first task involves ascertaining whether and to what extent the incentives applied favour (or disfavour) a particular activity which receives net incentives (disincentives) as compared with the neutral state of affairs. The second task entails analysing the effects of the incentives on the allocation of resources and other economic variables.

Ideally, all of those incidence analyses noted previously should be carried out in a general equilibrium framework. The same may equally apply and would be more appropriate in analysing the ultimate incidence of industrial policies. Undertaking that kind of exercise is, however, beyond the scope of the present investigation for several reasons. Firstly, finding the data and information for assessing the incidence of industrial policies under general equilibrium framework for the sample country (Korea) is a difficult task. Secondly, even if sufficient data are available, policies are assigned a limited role within the general equilibrium models, which are largely based on neoclassical, market clearing mechanisms. Moreover, the dynamic and spillover effects are hardly captured by existing neoclassical instruments. As discussed in Chapter 1, industrial policies are not theoretically justified in this type of framework. Further, it is hard to find economy wide models incorporating policy effects based on the deviations from the market paradigm discussed in Chapter 1.

Given the data and other limitations noted above, and taking into consideration the broad insights provided by prevailing incidence analyses, this study considers that, however it would be appropriate to view the incidence of industrial policies under two broad categories namely 'primary incidence' and 'final incidence'. The first category, 'primary incidence' implies the direct impact of industrial policy measures on

[1] Incentives were defined in the Balassa study as government measures that affect the allocation of resources among economic activities and their orientation between foreign and domestic markets.

particular industries in a given country. Broadly speaking, it refers to the specification of *what industries, using what measures, for what purposes, at what time and to what extent have been subjected to industrial promotion.* The other category, 'final incidence' refers to the impact that will presumably created through 'primary incidence' measures on economy wide or industry specific performance variables such as GDP and exports. Under these specifications, the present study will examine 'primary incidence' in relation to three sample countries, namely Korea, Malaysia and Thailand. Due to the data limitations, the analysis of 'final incidence' will be limited to Korea. To simplify the terminology the term 'incidence of industrial policies' will be used in this thesis only to refer to 'primary incidence', while the 'final incidence' of industrial policy will be referred to as the outcomes, or the impact of industrial policies.

4.3 The Methodology and Scope of the Study

The present investigation of the diversity and effectiveness of industrial policies includes three main parts. Part A of this thesis has covered theoretical arguments, a conceptual framework and an analytical review of empirical studies.

Part B of this thesis will investigate the diversity and incidence of industrial policies in East Asia in the light of the experience of three sample countries, namely Korea, Malaysia and Thailand. These sample countries are appropriate for studying diversity and incidence of industrial policies in East Asia for several reasons.

Firstly, it is well documented that all these three countries have recorded remarkable success in terms of economic and industrial growth, particularly during the period 1970-1996. It is also well known that they have vigorously applied a variety of industrial promotion measures. Nevertheless, very few empirical studies have been carried out to assess the effects of industrial policies on these economies.

Secondly, there is a perception that East Asian countries could be taken as a model for other developing countries and, indeed, that various East Asian countries achieved their success following a similar path. In fact, as Perkins (1994) noted these Asian countries demonstrate great diversity in the various dimensions of policy and it

is hard to find a single model that can be emulated by other developing countries. As previously argued, the diversity of industrial policies is another issue that has not been adequately covered in the literature. Since these three countries demonstrate quite distinctive patterns in their application of industrial policies, an investigation of the industrial policies of these countries could provide a sound basis for identifying similarities and differences within East Asia.

Thirdly, the sample countries are relatively large, compared to for example Hong Kong and Singapore, and contain characteristics similar to other developing countries. Therefore, implications drawn from these countries may provide useful insights for other developing countries.

Finally, the data and information required for assessing the diversity and effectiveness of industrial policies in these countries are readily available, and more easily accessible than for some other countries in East Asia.

As noted in Section 4.2, this exercise will emphasise on the incidence of industrial policies - 'primary incidence', as part of a broader methodology.

Given the importance of diversity, this study considers that an appropriate strategy to assess the effectiveness of industrial policy requires:

- measurement of the incidence of industrial policy in a given country and industry at a particular time;
- development of measures of the potential outcome of industrial policy; and
- assessment of the impact of industrial policy.

Selecting Korea as a case study, Part C of this thesis will attempt to measure these aspects quantitatively for this particular case.

(a) Assessing the magnitude of industrial promotion with incidence measures

Supplementing the detailed discussion of incidence of industrial policies of sample countries, as an initial step in the empirical assessment process, an attempt will be

made to examine the incidence of industrial policies quantitatively. The primary purpose of this exercise is to identify *what industries, using what measures, for what purposes, at what time and to what extent have been subjected to industrial promotion.* In effect this task will be important from a number of aspects.

Firstly, it was clear from the review of empirical studies in Chapter 3 that few attempts have yet been made to assess the incidence of industrial policies and their impact on particular industrial sectors or on the overall economy of these sample countries, from the perspective of diversity. Secondly, the examination of the incidence of industrial policies will assist us in understanding industrial policies broadly, since it considers details such as the extent to which instruments are applied, and the objectives for which industries have been promoted and so forth. Thirdly, it provides useful insights in assessing the new theoretical paradigms – the diverse role of policy intervention – relating to industrial policies. More importantly, with this type of analysis, it is possible to view policy intervention in a broad perspective. This means departing from established perceptions that policy intervention is uniformly good or bad for economies, to a type of analysis where it is possible to identify situations where policies work well and those where policies fail.

Given the comprehensive and dynamic nature of the incidence of industrial policies as noted in Section 2.3, selecting appropriate indicators for analytical purposes becomes a difficult task. Nevertheless, placing particular emphasis on certain important characteristics such as policy reforms, policy priorities, associated incentive measures and the selection of key/targeted industries of Korea, a number of proxies will be selected to represent incidence measures under two broad categories: (a) export promotion and growth related measures and (b) import substitution related measures.

Setting up the context under these two main categories is useful for a number of reasons. Firstly, it helps to limit the scope of the study and focus on key policy objectives. Secondly, most of the incidence measures are aimed towards achieving those two primary objectives in the case of Korea. Thirdly, these two objectives are commonly found in many developing countries, and therefore this analysis may provide useful insights for other developing countries too.

Having selected proxies for representing incidence measures, the next step in this study involves ranking industries on the basis of the magnitude of industrial promotion received by each industrial category (at the two-digit level). This process enables us to draw conclusions about whether promoted industries are exclusively limited to capital and knowledge intensive industries and whether industrial performance differ significantly between the promoted industries and those which were not. In this process, industries will be grouped on the basis of the ranks of (a) export promotion and growth related measures and (b) import substitution related measures, and will be further classified as highly promoted groups and less promoted groups for analytical purposes.

(b) Analysing the potential outcome of industrial policies

Taking value-added and exports as primary measurement criteria to reflect industrial performance, the potential outcome of industrial policies in Korea will be analysed, as a next step, in comparison with benchmark countries during the period 1970-1996. Value-added and exports are widely used as criteria for measuring industrial as well as economic performance. For the purpose of analysing the effectiveness of industrial policies, these indicators (the increase in value-added or exports) have limited value, since the improvement of these indicators for a particular country may be a result of a combination of factors which are interconnected and not only of the impact of industrial policies. Changes in these variables may be due to a favourable external environment, or it may be due to favourable internal factors such as sound macro or micro policies, including industrial policies, economic and political stability, policy reforms and so forth.

Therefore, the improvement of value-added or exports over time does not provide sufficient grounds for justifying the effectiveness of industrial policies. Comparison of the performance of value-added or exports with benchmark countries at this stage becomes useful, since it provides some way of taking account of the common external events such as favourable world demand conditions, world recessions, technological changes that might have influential effects on the industrial performance of a particular country and so on. It may also provide useful insights of

different internal macroeconomic policies between benchmark and the sample country. It will thus provide a base on which to identify what we will call the potential impact of industrial policies. If the performance of the industrial sector in the sample country is relatively higher than that of benchmark countries, that relative performance may be attributed to internal circumstances such as the impact of industrial policies. Such relative performance will be referred to here as the potential impact of industrial policies.

Ideally, it would have been better if the comparison had been made with benchmark countries that had not been pursuing industrial policies extensively. This is because such a comparison would highlight the performance differences between a policy implementing country and a country which has not followed policies intensively. However, this becomes impossible due to the non-availability of data at the sectoral level. After all, practically every country follows some sort of industrial promotion policies and hence finding countries which do not follow such policies becomes a difficult task. Under these circumstances a group of developing countries, which exhibit similar characteristics with respect to initial per capita, industrial structure and industrial composition as compared with three sample countries (Korea, Thailand and Malaysia) is selected as benchmark countries (details about the selection of benchmark countries will be included in Chapter 9).

In this analysis, we assume that if internal factors, and in particular industrial policies, had any impact on industrial performance in Korea, the performance of value-added and exports in Korean industries in general, and in promoted industries in particular, will be higher than that of benchmark countries over the period for which the policies had effect. If there is supportive evidence to justify the above assumption, then we may be able to make inferences regarding the potential outcome of government intervention.

To investigate the above noted assumption in relation to industrial performance in Korea compared to benchmark countries, using sectoral value-added and exports, a number of measurement criteria will be estimated. These measurement criteria, in each case relative to benchmark countries, will include: *(i) Value-added and exports in Korea; (ii) Index of value-added and exports; and (iii) Sectoral value-*

added as a share of GDP and sectoral exports as a share of sectoral world exports. All these estimations will be carried out over the period 1970-1996, using data (in thousand US dollars) obtained from the Australian National University data base, at the two-digit ISIC (International Standard Industrial Classification) level.

(c) Assessing the impact of industrial policies

To what extent can the relative value-added and export performance of Korean industries be attributed to industrial policies? To answer this question it is necessary to examine the association between industrial performance and incidence measures. Owing to the limited availability of data on incidence measures, however, it is difficult to carry out such an explicit analysis fully at this stage.

Nevertheless, three alternative methods will be applied in this thesis, to make inferences about the association between industrial performance and industrial policies. These three alternative methods include: (a) the examination of performance differences between industry groups by policy stance in Korea compared with benchmark countries; (b) the examination of performance differences in Korea by policy periods compared with benchmark countries; and (c) the investigation of the relationship between incidence measures and industrial performance using a regression analysis with panel data.

These three alternative tests will be used to make inferences regarding the effectiveness of industrial policies. More specifically we consider that if government intervention, especially industry specific intervention, has any impact on industrial performances in Korea then:

(a) highly promoted groups will show positively higher performance than similar groups in benchmark countries, and also than that of less promoted groups within Korea;
(b) industrial performance in Korea in general, and that of the highly promoted groups in particular, will be better relative to that of benchmark countries during the high intervention period (1970-82), but this relative performance will be less marked after the scaling down of intervention (1982 -1996); and

(c) there should be a positive and statistically significant relationship between incidence measures and relative industrial performance measures over the policy intervention period.

As the first step in empirical tests for analysing the impact of industrial policies, the differential performance of industry groups will be investigated by policy stance. Performance will be evaluated by estimating aggregate indicators of value-added and export performance for highly promoted groups and less promoted groups, with these groups being defined in terms of various incidence measures (export promotion and growth related measures and import substitution related measures) for benchmark countries and Korea respectively during the period 1970-1996. In addition, the average annual growth rates of value-added and exports will be compared for the above mentioned groups. The purpose of these exercises is to examine whether highly promoted groups in Korea perform comparatively better than that of a similar group of benchmark countries, and also compared with less promoted groups in Korea, during the observed period.

For the second test, indicators of value-added and exports will be compared for policy periods. Taking policy changes in Korea as guidance, for this test, two policy periods will be identified as the high intervention period and the period following high intervention. Available evidence that will be presented in Chapter 5 Section 5.3 frequently cites 1970s as the high intervention period for Korea. Beginning with stabilization measures introduced in 1982, however, Korea began to reverse its existing policy package. Thus the period between 1970-1982 will be referred to as the high intervention period. For this period, value-added and exports data will be estimated taking 1970 as the base year. The period between 1982-1996 will be referred as the period following retreat from the high intervention. Data for comparison purposes for this period will be estimated taking 1982 as the base year. The differential performance of industry groups that are based on incidence measures (export promotion and growth related measures, and import substitution related measures) in Korea for the two periods will be compared with that of similar groups in benchmark countries. In addition, average annual growth rates of value-added and exports for industry groups in Korea will be compared with that of benchmark countries for the two policy periods. The purpose of this exercise is to see whether

there are apparent differences in performance between Korea and benchmark countries during the so- called high intervention period and the period thereafter.

The third empirical test will examine the association between industrial performance and incidence measures using a regression analysis with panel data. Primarily, in this section six regression analyses will be carried out. These include: (1) the examination of the relationship between value-added and incidence measures (both export promotion and growth related measures, and import substitution related measures); (2) the examination of the relationship between value-added and export promotion and growth related measures; (3) the examination of the relationship between value-added and import substitution related measures; (4) the examination of the relationship between exports and incidence measures (both export promotion and growth related measures and import substitution related measures (5) the examination of the relationship between exports and export promotion and growth related measures; and (6) the examination of the relationship between exports and import substitution related measures. The purpose of this exercise is to test whether industrial policies as quantified by the incidence measures, have a significant effect on industrial performance in Korea.

4.4 Data Sources and Limitations of the Study

The empirical analyses, in particular the quantitative analyses that will be applied here, are not free from limitations, for a number of reasons. First of all, these empirical analyses may not reveal the true nature of the potential outcomes or the effectiveness of industrial policies, due to the limitations of the data. Finding the required data in relation to incidence measures and industrial performance, covering the period 1960-1997, has been a difficult task for all the sample countries. Owing to this, quantitative analysis of the incidence of industrial policies will be limited to Korea, as has been noted earlier. Even this task has severely suffered from the lack of data at the sectoral level. As a result, not only did we have to depend on several proxies while making assumptions when using data, but also we had to limit the period of investigation of incidence measures to 1960-1980 and the analyses of the potential outcome to the period between 1970-1996. The inferences made through the empirical analyses are therefore subject to these qualifications.

Owing to the paucity of data, the analytical techniques used in this study, especially the methods applied for assessing the impact of government intervention, are also not free from limitations. For instance, data applied for analysing the potential outcomes are available in US dollars at the International Economic Data Bank (IEDB), Australian National University. These data may not reflect the industrial performance values correctly since the exchange rate of a particular country may not necessarily determined freely for all the countries. In addition, due to the unavailability of data on production indexes for each individual benchmark countries, the data applied for the present investigation are converted into real values by using the production price index of the US. Moreover, the lack of data at disaggregated level, has severely restricted the selection of benchmark countries for comparison of policy outcome. The sample countries may have limitations in representing the neutral policy base and therefore interferences that will be made in this study are subject to qualifications.

Moreover, as will be discussed in detail in Chapter 10, for the first empirical test, industries are classified on the basis of limited evidence of incidence measures as highly promoted groups and less promoted groups of Korea. The second empirical test will compare industrial performance between the two policy periods The inferences made on the basis of the first test may subject to qualifications due to the classification bias. Similarly, the results of second test are required caution since the base years selected for comparison are selected on the basis of policy priorities in Korea which may not equally reflect the true outcome for benchmark countries. The third empirical test, the regression analysis based on pooled data is also not free from limitations. In a regression involving pooled data where time series and cross sectional observations are combined, it is implicitly assumed that the regression parameters do not change over time and that they do not differ between various cross sectional units. However, the data for incidence measures and performance variables in the sample we applied vary significantly between industrial sectors and also from time to time and significant outliers are evident in the case of incidence measures. Moreover, simple models that will be applied in this study will not provide true picture, if incidence measures are related each other and if there is a feedback from performance variables to incidence measures.

Thirdly, by analysing economic effects themselves one cannot gauge the effectiveness. In parallel with positive or negative economic effects, industrial policies may create some other desirable or undesirable results in the economy. For instance, industrial policies may create desirable or undesirable effects on income distribution, the balance of payments, relative price levels, spatial distribution of production and so on. In such circumstances, though a full cost-benefit analysis would be more appropriate, even such an analysis is not free from limitations. In these and other respects the conclusions derived in this study may not represent the true nature of effectiveness.

4.5 Structure of the Rest of the Thesis

The objective of the rest of the thesis – the empirical analysis – is to explore the various forms of diversity of industrial policy in the light of experience of three East Asian countries, namely Korea, Malaysia and Thailand. To test the applicability of these, this thesis will:

- document the diversity of objectives, incidence, and the factors affecting the economic outcomes of these countries (Chapters 5-7);
- measure the incidence of industrial policies for Korea (1960-1983) (Chapter 8);
- develop a basis for assessing the potential outcomes for Korea (1970-1996) (Chapter 9); and
- use these two elements (evidence in both Chapters 8 and 9) to undertake a preliminary analysis of the impact of industrial policy in Korea (Chapter 10).

Part B: Diversity and Incidence of Industrial Policies, 1960-1997

5. Diversity and Incidence of Industrial Policies in the Republic of Korea, 1960-1997

5.1 Introduction

The Republic of Korea[1] became an independent nation in 1948 after 36 years of Japanese occupation (1910-45). Though Korea inherited some of its industrial production capacity from colonial rule, much of this capacity had been destroyed over the three years (June 1950 to July 1953) by the Korean War (Suh 1981). This war devastated economy was largely dependent on foreign or mostly US aid throughout the 1950s. Until it began its industrialization process with the First Five Year Development Plan in 1962, Korea had remained an economy primarily based on subsistence agriculture. As the available evidence suggests, in 1960 agricultural, forest and fishery constituted 47.2 per cent of Gross Domestic Product, while manufacturing activity constituted only 7.2 per cent (Koo 1982, p. 4). Starting from such a small industrial base and meagre resources, the spectacular economic and industrial performance achieved by Korea during the past few decades has often been cited as a miracle.

As can be seen from Table 5.1 (column 2), Korea has achieved remarkable growth in terms of its GNP per capita. In 1970, Korea's GNP per capita was $US 974. After a decade, Korea managed to increase this more than twofold. With continuous progress, Korea has recorded more than sixfold increase of its GNP per capita by 1995. Korea has also maintained high economic growth over the past three decades as demonstrated in Table 5.1 (column 3).

Likewise, the manufacturing sector has displayed a very strong performance both in terms of value-added and exports. As the data in Table 5.1 (column 5) illustrate, manufacturing sector value-added as a percentage of GDP increased from 14 per cent in 1960 to 21 per cent by 1970 and to nearly 30 per cent by 1990. After 1990, the manufacturing sector contribution in terms of growth of value-added has

somewhat slowed down in comparison to the previous three decades, yet remains at comparatively higher levels. Manufacturing sector exports have remained prominent throughout past three and half decades. As Table 5.1 (column 7) indicates, the manufacturing sector accounted for nearly 60 per cent of merchandise exports in Korea in 1965. After three decades almost all of its export income from goods is derived through the manufacturing sector. By 1995, the manufacturing sector accounted for 93 per cent of Korea's merchandise exports.

Table 5.1 Economic Indicators of Korea, 1960-1995

Year	GNP per capita ($US,1987)	GDP (% growth)*	Manufacturing Value-Added (% growth)*	Manufacturing Value-Added (% GDP)	Agriculture Value-Added (% GDP)	Manufacturing Exports (% merch. exp)	Manufacturing Exports (% growth)*
1960	-	-	-	13.6	35.8	-	-
1965	-	-	-	17.5	37.2	59.3	-
1970	974	9.0	17.7	20.8	25.4	76.5	24.7
1975	1378	7.5	13.7	26.1	24.1	81.4	19.7
1980	1894	5.8	11.9	28.7	14.5	89.5	8.6
1985	2588	6.6	9.1	29.3	12.5	91.3	7.0
1990	4097	7.7	9.2	29.2	8.7	93.5	6.5
1995	5584	5.6	6.2	26.8	6.5	93.3	12.3

Notes: - data not available.

* Five Year Average (data are in constant $US, 1987 prices).

Source: World Tables, World Bank, ANU.

This outstanding manufacturing sector and overall economic performance have been attributed in the published literature to a variety of internal and external factors. Some commentators (Boyd 1994; Amsden 1989; Wade 1988, 1990a, 1990b; Cheng 1994; Stern 1990) claimed that prudent state economic policies including trade, macroeconomic and industrial policies have been largely influential for achieving such success. Others (World Bank 1987; Chang 1994; Yu 1995; Kim 1985; Petri 1993; Nugent 1989) pointed out that numerous other factors – including an outward orientation, a skilled labour force, an efficient bureaucracy and institutions, favourable world economic conditions, historical factors, private sector initiative and entrepreneurial ability to maintain competitive advantage and the size distribution of

[1] Hereafter Korea is used instead of the Republic of Korea and South Korea.

manufacturing plants – had also created a favourable impact on industrial and economic outcomes in Korea. However, no coherent view has yet been established regarding the factors behind this phenomenal success, partly due to the lack of explicit empirical evidence.

The main objective of this chapter is to explore the ways in which the government assisted economic activities by applying industrial policies in the economy of Korea over the period 1960-1997. This exercise will be helpful for further investigation of industrial policies in a number of ways. Firstly, the examination of the incidence of industrial policies will provide useful insights for developing alternative techniques to analyse the effectiveness of industrial policies empirically, which this study attempts to do in three later chapters (Chapters 8, 9 and 10). Secondly, this analysis, together with incidence analyses of Malaysia and Thailand, will help to identify the similarities and differences of industrial policies between these countries. Thirdly, investigations of the incidence of industrial policies should provide useful insights in making inferences relating to industrial policies, such as whether the experience of sample countries provides supportive evidence for recent theoretical concepts of industrial policies and why similar policy strategies may generate diverse results in different situations. Fourthly, the incidence of industrial policies has not been adequately discussed in the literature and therefore these analyses will help in broadening the perspective of that discussion.

This chapter is organised in the following manner. Section 5.2 includes a brief review of various country-specific factors, such as the objectives of industrial policies, historical factors, industrial structure, and so on, that could possibly influence the outcome of industrial policies. How industrial policies changed over the period of 1960-1997 is discussed in Section 5.3. Section 5.4 describes the diverse policy instruments applied by Korea. These policy instruments are discussed under two sub-headings, namely import substitution related measures and export promotion and growth related measures.

5.2 Diverse Country-Specific Factors

Initial conditions and certain other country-specific factors create an influential impact on policy implementation in any economy. Some of the important factors will be briefly reviewed in the following section.

5.2.1 Objectives of Industrial Policies

Prior to 1960s, the main concern of the Korean government was to reconstruct its war-devastated economy. No systematic effort towards industrialization was therefore evident (other than the emphasis placed on import substitution in basic necessities such as flour-milling, sugar refining, and textile manufacturing) until the early 1960s. The decline of US aid and associated foreign exchange constraints, however, led Korea to rethink its economic strategies. As a resource poor country, in order to alleviate some of its prevailing economic problems, Korea decided that more systematic and concerted efforts towards industrialization were necessary. Consequently, several major economic reforms were initiated in the Korean economy in the early 1960s.

More importantly, as part of the reform process, Korea chose an export oriented growth strategy in 1962, beginning with its First Five Year Development Plan (1962-66). With the primary objective of industrialization through modernization of industries, this plan also aimed at: (1) attaining self sufficiency in the production of food; (2) expansion of key industries (coal, cement, fertilizer, steel ingot and refined petroleum), electricity and transportation; (3) increased employment; (4) improvement of the balance of payments through export expansion; (5) maximizing mobilization of domestic resources and increased foreign capital inflow (Hong 1979, p. 39). Like their predecessors, Five Year Development Plans introduced subsequently continued their emphasis towards promoting key/strategic industries. In addition to this primary objective, for instance, the Second Five Year Development Plan (1967-71) emphasized the importance of: (1) increasing domestic savings; (2) promoting exports of labour-intensive industries; and (3) import substitution of food and capital goods. Continuing similar objectives, the Third Five Year Development Plan (1972-76) stressed the importance of promoting heavy and

chemical industries.

The Korean government believed that the cause of the balance of payments problem lay in the underdevelopment of the capital and intermediate goods industries. With the objective of overcoming this constraint, and of becoming an independent economy – driven by strong economic nationalism – and also of achieving rapid economic growth in a short period of time, Korea wanted to increase its exports and also to upgrade its industrial structure (Cheng 1994). Therefore, essentially all the Five Year Development plans introduced after 1962 have more specifically emphasized two policy goals, namely: (1) export promotion in the manufacturing sector and (2) the promotion of industrial self-sufficiency in selected heavy and chemical manufacturing industries (Suh 1981, p. 20). These two objectives were given paramount importance and continued until the mid 1970s (Westphal 1990; Amsden 1989; Suh 1986).

With the introduction of the Fourth Five Year Development Plan of 1977-81, however, policy objectives began to shift towards promoting industries beyond the assembly stage and emphasising product quality. This plan also emphasized the importance of achieving a complete self-reliance in investment financing, and a current account surplus (Hong 1979, p. 43). By the latter half of this planning period, partly as a result of the second oil shock and several internal factors, the Korean economy experienced structural problems and macroeconomic imbalances. Inflation accelerated and many heavy and chemical industrial projects suffered from weak export competitiveness, overcapacity and large operating losses. Against this background, the government considered that some changes in its policy orientation, in particular certain structural adjustments were necessary. With the objective of maximizing the efficiency of resource allocation, therefore, in the Fifth Five Year Development Plan (1982-86), policy makers stressed the importance of: (a) continuing high growth; (b) price stability and (c) improvement in income distribution (Suh 1986, p. 36).

Since the early 1990s, a consensus has been developing among businessmen, policy makers and economists that innovation is one of the most critical sources of potential growth in Korea. Consequently, the Ministry of Trade and Industry (MTI)

announced in 1994 that it would reorient from an export-driven to a technology-driven industrial policy. Subsequently, in 1995, the MTI introduced a development plan for industrial technology development and for the development of technology infrastructure.[2] Along with this plan, Korean policy makers stressed the importance of providing infrastructure for innovation (Seong 1997).

In sum, export promotion and achieving industrial self-sufficiency in certain key/strategic industries have been major motives of Korean industrial policy ever since it began its industrialization process. Since the mid 1970s, with the objective of realising the potential growth benefits of technology driven products, development plans also aimed to transform the industrial structure from simple assembly type industries to technologically advanced and innovative products. Overall, as is clear from the above discussion, Korea pursued its industrialization process with clearly outlined policy objectives, although these varied in some respects over time.

5.2.2 Historical Factors

As the available evidence suggests, historical factors such as Japanese colonial rule, US aid, the Confucian tradition, the long tradition of centralisation and the authoritarian military regime, have been very influential in the process of building up the industrial sector in Korea (Edwards 1992a; Cathie 1989; Amsden 1989). Of these factors, Japanese colonial rule, for instance, appears to be important for Korean industrial development in many respects. Firstly, though there were certain restrictions on the development of indigenous capital, Japanese colonial rule had considerable impact on the economic, political and industrial development of Korea, especially in creating a modern infrastructure in the areas of finance, transportation and commerce. Secondly, the colonial period enabled Koreans to acquire substantial knowledge about modern industries. Thirdly, a number of attributes such as Korea's unitary and internally cohesive nature, its strength and desire for autonomy, and the similarity of Korea's industrial policies and structure to that of Japan, are believed to

[2] The FiveYear Development Plan series did not continue after the Fifth Five Year Development Plan. Two other plans were however initiated in the early 1990s. In 1993, a five year plan for the new economy, was initiated with the objective of expanding market liberalization and to internationalized economic regulations and practices. In 1994, the "Foreign Exchange Reform Plan" was initiated to facilitate the liberalization of foreign exchange and opening of the capital market (Park 1996, p. 32).

be inherited from the Japanese colonial occupation (Moon 1994; Westphal et al. 1981). Moreover, many of the decisions concerning which industries should be promoted were also based on Japanese experience (Stern 1990).

Likewise, massive US aid has played a dominant role in the economy of Korea, especially by providing foreign exchange for buying raw materials, capital equipment and know-how, and for setting up production and education facilities. This facilitated a rapid expansion of the industrial sector during the reconstruction period after the Korean war. Also, the relationship with the US has enabled Korea to enhance its technological status through technical advisers and through the local procurement program operated by the US military authority, and has assisted the export of Korean products to US markets (Edwards 1992a; Westphal et al. 1981; Kim 1985; Stern 1990).

5.2.3 The Decision Making Process

Compared to other developing countries, the decision making process of Korea has a number of unique distinguishing features. Firstly, the Korean process differs from others in its centralized decision making structure. This mainly consists of the Blue House (Office of the President), the Economic Planning Board (EPB), the Ministry of Trade and Industry (MTI) and the Ministry of Finance, which are staffed by the best managerial talent available in the economy, are relatively free from strong pressure groups and enjoy a high degree of autonomy in decision-making.

Of these, the EPB, which plays a dominant role in the decision making process in Korea, is responsible for economic planning, national budgeting, foreign capital management, technical cooperation and statistics administration (Whang 1986, p. 4). Thus, most of the essential tasks needed for decision making are handled by the EPB. This centralized decision making process works well in the case of Korea and appears to be more effective than that of comparable countries, because of certain peculiar characteristics. The comprehensive procedure adopted in the preparation of plans enabled Korea not only to maintain the effectiveness of planning but also to build up confidence about the economic policies envisaged by the plans. To prepare Five Year Development Plans, for instance, the EPB generally provided preliminary guidelines

in terms of major policy targets and directions, together with macroeconomic projections for both the international and domestic environment of the economy during the plan period and beyond. Individual ministries prepared their own sectoral plans according to these specifications. In this task, the Korean government made extensive use of working committees whose members were experts drawn not only from government ministries but also from industrial associations, financial institutions, universities and research institutes (Whang 1986). To ensure the further effectiveness of planning, the government of Korea monitored the progress of plans closely and adjusted the policy direction where necessary. As Yu (1989) noted, these planning processes – identifying prevailing problems and weaknesses, setting targets to achieve outcomes within a proper time frame and then formulating development strategies and policies to achieve these targets – played an important role in the development of industries in Korea

Maintaining the effectiveness of both the planning and decision making processes was further possible due to the authority inherited by the EPB, together with the organization of most essential functions in decision making under the control of the EPB. Beginning in the mid 1970s, the formulation and implementation of heavy industry planning was highly centralized in the Blue House and the Ministry of Trade and Industry bypassing the Economic Planning Board. With the political changes in the 1980s, economic policy making was again centralized in the Economic Planning Board. As a central authority in decision making, the EPB was more powerful since it is operated directly under the Prime Minister and other ministries were expected to support its policies. The smooth operation of the planning and decision making process was further ensured by the fact that both these functions were under the aegis of the EPB. Overall, this centralisation of economic policy making power in the hands of the EPB eliminated conflict of interests, improved communication and mutual understanding between planning and industrial ministries, and facilitated more effective implementation of industrial policies (Whang 1986; Amsden 1989; Haggard and Moon 1990). Furthermore it allowed the government bureaucracy to make speedy decisions and to adjust flexibly the direction of current policies when a major problem arose.

Secondly, the decision making process of Korea is also different from that in

other countries because of its extensive interference in private sector decision making. This is specially the case for decisions affecting industrial development. In general, economic planning outlined most of the important issues affecting industrial promotion, in particular the development of key industries, modernization of the industrial structure and creation of an infrastructure. In addition, most of the private sector entrepreneurial functions, ranging from planning, coordinating and even making decisions about the expansion of the industries, industrial diversification, capacity reduction and mergers, have been influenced substantially by the government. Since the business class was weak and heavily dependent on state support, the Korean government was able to consolidate its power easily for these types of activities, especially during their early period of industrialization (Edwards 1992a; Amsden 1989). In spite of government control, "private businesses maintained a close, long-term, cooperative relationship with the government but not on an equal footing: the state is pace setter and guide, while business follows" (Moon 1994, p. 143). Such a close relationship between government and large firms was believed to be more effective than the market mechanism for achieving development goals (Lee 1993).

Thirdly, to avoid the potential negative effects of government intervention, Korea has followed Japan in adopting administrative guidance, which often involves certain performance standards. The Korean experience suggests that providing protection or generous incentives is not sufficient to achieve satisfactory progress. The extent of the monitoring procedure is equally important too. Unlike other countries, incentives were not given lightly to firms in Korea. In order to take advantage of and to continue to receive government support, firms were required to fulfil certain government targets – usually quarterly export targets. Whether successful or not all industries, including infant industries, had to start their production with the intention of exporting their products. In the case of the automobile industry, for example, all investment projects had to prepare a plan to export at least 50 per cent of output, and the minimum local content ratio was required to increase to 70 per cent (MacIntyre 1994). Firms were subjected to consistent and comprehensive government monitoring processes, which were carried out for individual commodities, markets and firms. For example, the progress of the policies was monitored at monthly meetings of cabinet members, business people and

government officials, chaired by the President of Korea. These meetings – the Monthly Economic Review, the Monthly Export Promotion Conference, and the Quarterly Science and Technology Promotion Meeting – further served as a mechanism for sharing information and enhancing coordination not only among individual ministries but also between the government and the private sector. To prevent violations of these requirements, pressure and penalties were imposed. For example, violators of restrictions and regulations could be heavily punished with the revocation of licenses, fines and, in some cases, prison sentences (Chang 1994). Moreover, the Korean state has been willing and able to withdraw support whenever performance lagged. Such state discipline, intimately combined with investment and trade policies, acted as a powerful incentive for firms to enhance their capabilities (Amsden 1989; Wade 1990b).

Fourthly, the Korean decision making process departs from some others in its ability to use a combination of government intervention and the market mechanism. One might think that there is no role for the market mechanism due to the overwhelming role of the government in Korea. But Korea did not entirely depend either on the market mechanism or on the role of the state. Though the policies adopted in Korea encouraged and favoured a large scale, oligopolistic industrial structure, the government not only encouraged competition between domestic firms but also instructed them to prepare their products for the export market from the outset. Realising the potential benefits of the market mechanism, the government paid attention to improving market mechanisms, in particular activities related with international markets from the early 1970s. The greater role of market mechanisms has in fact partly been necessary to overcome certain structural weaknesses, such as the underdevelopment of the financial sector and insufficient development of small and medium size firms. It was also important in reducing uncertainties and risks related to business, disseminating information about opportunities and minimizing the overall price, trade and macroeconomic distortions. With the introduction of a series of comprehensive institutional reforms, such as the devaluation of the exchange rate, promotion of foreign direct investment and the reduction of preferential treatment for industries, further attempts have also been made to improve the market mechanism in the 1980s. Korea has thus demonstrated its ability not only in mixing policies but also in identifying and implementing appropriate policies at different times.

5.2.4 Industrial Structure

The industrial structure of Korea is dominated by a small number of large firms – mainly the *chaebols*,[3] which are family-owned conglomerates. Nine of the ten largest companies are privately held domestic conglomerates. This dominant structure, established immediately after the Japanese colonial period, emerged as a result of generous policy incentives, cultural influences (embedded Confucian values) and regime dynamics (adjusting to the changing economic and political circumstances of Korea) (McKay and Missen 1995). Whatever the factors, the encouragement of the *chaebol* was largely influenced by the strong nationalist sentiment, which was anti-communist as well as anti-Japanese.

The four major *chaebols* include Hyundai (automobiles, construction, cement, shipbuilding and steel), Samsung (entertainment, hotels and newspapers), Daewoo (construction, electronics, shipbuilding), and Lucky Goldstar (plastics and electronics). Of those Samsung is the biggest *chaebol.* The activities of large firms are diversified and highly coordinated. In many respects they resemble the Japanese *Zaibatsu.* Each of these firms has a number of affiliates. For example, Lucky Goldstar contained sixty-two companies while Samsung had thirty-seven related firms in 1988.

5.3 Diversity of Policies over the Period of 1960-1997

Korea began its industrialization process during the 1960s by following Import Substitution Industrialisation (ISI). The majority of the industries started in this period were non-durable consumer and intermediate goods and these were largely promoted using quantitative restrictions rather than tariffs. With the decline of US aid and associated foreign exchange constraints, and also due to the distortions created by the prevailing ISI policies, Korea realized that limiting production to the small domestic market would no longer be advisable. As a result, a series of policy reforms had been initiated by the mid 1960s (Kim 1985; Suh 1986) including: (a) the

[3] In the literature this is also referred as "jaebol".

exchange rate reform (the unification of exchange rate); (b) devaluation of the currency and the liberalization of exchange controls; (c) liberalization of trade involving cuts in tariffs and the abolition of quantitative restrictions and (d) a substantial increase in real interest rates.

Along with these policy changes, from 1961 onwards, the policy emphasis gradually shifted towards export oriented industrialization. Light, labour intensive manufacturing industries promoted over the 1961-70 period were encouraged largely through government regulations such as those governing wages, suppressing trade unions, providing preferential credits and generous incentives,[4] and designating a certain number of manufacturing industries, for example textiles and consumer electronics, as strategic industries (Schive 1990; Rimmer 1995; Suh 1981). Several other measures have also been introduced so as to offset disadvantages arising from the protective measures. For instance, Korea's *Tariff Act* allowed tariff exemptions and rebates on imported inputs for export production; the tariff drawback system enabled domestic exporters to avoid the erosion of export competitiveness caused by cost increases stemming from import protection; while import substituting industries were largely protected through non tariff barriers.

By the early 1970s, Korea realised that it was losing its comparative advantage in labour intensive industries largely due to the rapid increase in domestic wages. Rising protectionism against light industrial products also acted as another limitation to expanding such industries. In order to increase the independence of the economy, and also to emerge as a technologically advanced nation, Korea felt that it was required to develop capital intensive and intermediate good industries. Consequently, the export orientation was more biased towards capital-intensive heavy industries from the early 1970s (Stern 1990; Chang 1994).

The Heavy and Chemical Industry (HCI) drive,[5] which began in 1973 and continued through 1979, was implemented and encouraged using subsidized credit,

[4] For more details about incentives see Table 5.2

[5] Although attempts had been made to initiate heavy industries since the1960s, financial and technical assistance sought from various sources including the World Bank, Japan and some European countries, were turned down on the grounds that the domestic market would be too small to support an economic-sized plant, there were no domestic supply of raw materials and there was a lack of experience and

special tax policies,[6] selective protection, entry restrictions, granting of infant industry status in new industries, and guaranteeing firms a monopoly position, together with direct government involvement in industrial decision making. At the same time, attempts were made to scale down government support for labour intensive industries. For example, the 50 per cent reduction in corporate and income tax on export earnings for labour intensive industries was abolished in 1972. By mid 1975, the tariff exemptions for imports of raw materials for export production were also reduced (In-Joung 1989; Suh 1986; Rhee 1987; Edwards 1992a; Chang 1994; Seong 1997; Westphal 1990; Rimmer 1995).

By the year 1979, the Korean economy faced severe structural problems and macroeconomic imbalances, as a consequence of both internal and external events. The industrial policies of the 1970s were partly responsible for creating high inflationary pressure in the economy. Also, as a result of a massive investment boom, the Korean economy was flooded with inefficient firms. In particular, the HCI drive led to declining export performance, excess capacity and unstable financial structures in many manufacturing industries. The banks were plagued by accumulating non-performing loans. These circumstances were further aggravated by sharply increasing real wages and the appreciation of the real exchange rate (Seong 1997; Haggard and Moon 1990; Suh 1986).

To overcome these problems, the government announced, in 1980, the Comprehensive Stabilization Programme,[7] comprising conservative fiscal and monetary policies. The major contents of this program included: restrictive budget management with expenditure cuts; restrictive monetary policy with the aim of improving the operation of preferential policy loans and interest rates, and plans to adjust investment in the heavy and chemical industries (Nam 1984, p. 24). Further, a task force, set up to deal with the problems, forced inefficient firms into mergers, sales and liquidation. At the same time there was mounting foreign pressure over unfair trade practices. In response to this pressure, the government introduced several

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skilled workers.

[6] Among the numerous tax incentives provided, the set of incentives provided by the *Tax Exemption and Reduction Control Law* since 1975 under the heading of "Special Tax Treatment for key Industries" has been the most powerful in directing investment resources into several key industrial sectors. (Kwack 1985).

policy reforms, including the lifting of restrictions on bank management by divesting equity shares in five commercial banks, and lifting some previous restrictions on foreign direct investment.

Along with these changes, Korean industrial policy has gradually changed from industry specific intervention to a functional approach (general industrial support without bias) since the early 1980s. The preferential policies, such as subsidised loans, special tax, and tariff concessions, which were applied to promote particular industries begun to disappear during this period. For instance, the government reduced the subsidy elements in the preferential loans, by lowering the interest rates on non-preferential loans faster than the rates on policy loans. As a result, the interest rate differential between the two kinds of loans largely disappeared. Similarly, with the reforms introduced in the tax system in 1981, the preferential tax treatment was also largely eliminated. Tariff incentive schemes underwent similar changes with the revision of the *Tariff Act* in 1983. The special laws which promoted machinery, electronics, textiles, iron and steel, non-ferrous metals, petrochemicals and shipbuilding industries were either abolished altogether or replaced in 1986 by the *Industrial Development Law*, which was based on the principle that policy support to specific industries should be abandoned in favour of providing general industrial promotion support. It also aimed at gradually phasing out declining industries (Nam 1992; Kim 1989a). A shift of emphasis from large *chaebol* to small and medium size enterprises was also apparent.[8]

These stabilization measures were, however, undermined by rapid internal changes, particularly political instability caused by the assassination of President Park. This situation was further affected by unfavourable external conditions, including the second oil shock, the resulting worldwide recession and rising interest rates. Nevertheless, the comprehensive stabilization program could be viewed as the turning point that steered economic policy in a new direction.

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[7] For more details of this comprehensive stabilization program see Nam (1984).
[8] For more details see Yoo (1990), Stern et al. (1995), Rhee (1987) and Nam (1984).

Table 5.2 Incentives and Institutional Support for Promoting Industries in Korea, 1950-1997

1950–1960
Main Strategy – Import Substitution
• Tariff incentives, credit assistance, protection
1961–1972
• **Main Strategy – Promotion of Light Export Industries/Import Substitution**
• *Incentives:* Tariff exemptions on imported raw materials, intermediate and capital goods imported for export production; accelerated depreciation allowance for fixed capital and for manufacturing firms that earn more than 50 per cent of the revenue in foreign exchange; preferential rates on overhead inputs, such as electricity and transport; quantitative restrictions on imports of goods and capital; foreign currency loans to finance exports on long-term credits; export insurance; short-term preferential loans at interest rates below the commercial bank discount rate for exports; automatic loan approval and medium and long-term preferential loans for capital investment for export production; an export-import link system in which certain specified items were granted an automatic approval of the importation of certain items; the wastage allowance system by which certain proportion of raw materials imported duty free for export production was allowed for domestic use; special provisions for large trading companies that exported more than the annually adjusted export target and met the commodity and market diversification • Korea Trade Promotion Corporation (1962) – promoted Korean products through displaying, and international trade fairs, and sending trade missions • Korea Scientific and Technological Information Centre (1962) – collected and disseminated scientific and technical information • *Export Industrial Estate Development Law* (1964) – promoted exports • Interest rate reform (1965) – raised interest rates on deposits from 15 per cent to 30 per cent to increase savings • *Foreign Capital Investment Act* (1966) – imposed regulations regarding technology licensing and foreign direct investment • Korea Institute of Science and Technology (1966) – carried out applied research, project feasibility studies, technical service for small and medium scale industries, pioneered new products and processes, adapted and improved foreign technologies • Tariff reform (1967) – changed from a positive list system to a negative list system and under this system all items not subjected to restrictions were automatically approved • *Science and Technology Promotion Law* (1967) – promoted science and technology • *Machinery Industry Promotion Law* (1967) – promoted investment in the machinery sector • *Electronics Industry Promotion Law* (1969) – promoted electronics industry • Preferential treatment for key/strategic industries through tax, finance, exemption for R&D expenditure, tariff exemption or deduction (deduction rate of 100-80 per cent) for facility equipment, machine, raw material, parts and components
1973-1981
Main Strategy – Promote Heavy Industries through Import Substitution and Export Promotion
• *Incentives*: Ban on imported products; introduced generous incentives for heavy industries: below 20 per cent tax rate; complete exemption of corporate and income tax for the first three years and 50 per cent exemption for another two years; accelerated depreciation up to 100 per cent of the normal depreciation allowances; preferential credit assistance with low interest rates, preferential depreciation; tax-free reserves for investment; tax credit or exemption for R&D expenditure; tax free reserves for expenses in technology development; tariff deduction (deduction rate of 90-70 per cent) for facility equipment, machine, raw material, parts and components • *Heavy and Chemical Industries Act* (1973) – promoted heavy and chemical industries • First Free Export Zone in Mazan (1970) • Interest rate reform (1972) – reduced the rate of interest (continued)

- *Technology Development Promotion Law* (1972) – decided the incentives for promoting innovative activities, upgraded industrial capabilities
- *Engineering Services Promotion Law* (1973) – promoted the development of local engineering capabilities, enforced performance standards on local engineering firms
- *National Technical Qualification Law* (1973) – promoted the status of professionals in technical fields by a system of examination and certifications
- Human capital development – promoted overseas training for Korean managers and engineers, enacted a law that made in-plant training compulsory, established the Korea Advanced Institute of Science (1971)
- *Price Stabilization and Fair Trade Act* (1974) – controlled prices in the private goods market having a monopolistic or oligopolistic industry structure to lower the inflation and to restrict collusion or conspiracy and unfair trade practices
- Free Export Zone – Iri (1974)
- National Investment Fund (1974) – provided funds to purchase machinery and additional funds for exports on deferred payments
- Tariff drawback system (1975) – provided facilities to enable domestic exporters to avoid the erosion of export competitiveness caused by the cost rise stemming from import protection
- Comprehensive Stabilization Program (1979-81) – shifted emphasis from industry specific intervention to functional approach, lifted restrictions imposed on FDI

1982-1997

Main Strategy – Export Promotion/Import Substitution (high value-added/ technology intensive industries with less emphasis on industrial targeting)

- Improving market mechanism – liberalization, devaluation of exchange rate, reduction of preferential treatment for strategic industries
- Financial market liberalization – elimination of subsidized policy loans, privatization of commercial banks
- *Foreign Capital Inducement Act* (1984) – imposed liberal policies towards promoting FDI such as the introduction of positive list of industries which open to FDI and a negative list of industries that were restricted to foreign investors, automatic approvals (for the projects where foreign ownership is less than 50 per cent, and projects that invest less than US$ 1 million)
- *The Small and Medium Industry Systemisation Law* (1982) – promoted sub-contracting through tax and financial incentives, local content requirement
- Promoting small and medium scale industries and reducing bias towards large firms – financial incentives for R&D, marketing and industrial expansion activities directed towards small and medium scale industries
- *Law of Coordination of Business Activities of Small Enterprises* – prevented competition between small industries, and small and large industries
- *Monopoly Regulation and Fair Trade Act* (1981) – banned collusive or entry limitations, take-overs, competition limiting joint activities and unfair trade practices
- *Industrial Development Law* (1985) – changed industrial policy from selective intervention to functional intervention
- *Research and Development – Amended Technology Development Promotion Act in 1977 and 1981*
- *Incentives for R&D*: 10 per cent tax credits for expenses for R&D and capital expenditure on R&D; accelerated depreciation allowances, reduced tariffs for imported R&D equipment; preferential financial facilities; firms are allowed to set aside 20 per cent of its profits before tax for R&D in any one year to be used for its R&D work in the following two years; income tax exemption for reserve for technology development, income earned from engineering services, local government tax, royalty income; income tax; deduction of 10 per cent on expenses used for technical human resource development; income tax deductions on expenditures paid to technology related institutes; allowed exemptions from military service for their R&D personnel
- HAN/G7 project – promoted science and technology capabilities to the status of advanced countries
- Preferential treatment – technologically leading industries tariff deduction (deduction rate of 65-55 per cent) for facility equipment and machine

Sources: In-Joung (1989), Edwards (1992a), Amsden (1989), Kim (1989), Yoo (1984, 1989), Lee (1993), Westphal (1990), Chu (1994), Dollar and Sokoloff (1994), MacIntyre (1994), Salazar (1989), Kim (1985), Suh (1981), and Rhee (1987).

In particular, it involved shifting emphasis from the promotion of particular industries (industry specific intervention) to a greater reliance on the market and overall economic efficiency.

However, since the mid 1980s, with the assistance of favourable external factors (the gradual devaluation of the Korean Won in real terms against the US dollars in world markets and lower interest rates in world financial markets), the economy regained growth momentum. The economy of Korea in fact witnessed strong economic performance particularly during 1986-88. Encouraged by a low price of oil, low international interest rates and low value of the yen, not only had the annual GNP growth rate remain above 12 per cent but Korea also recorded sizeable current account surpluses during this period (Park and Kim 1992, p. 11). This favourable situation, especially Korea's trade surpluses, triggered calls from foreign countries for further liberalizations. At the same time, wage increases and work stoppages, appreciation of the Korean Won, protectionist pressures from major industrial countries and deregulation of direct foreign investment created serious threats to Korea's international competitiveness. In response to this situation Korea accelerated its liberalization schedule. Facing with the new economic environment, such as the launching of the World Trade Organization and the acceleration of globalization in the 1990s, the Korean government rearranged its industrial support system more in line with international standards, placing more emphasis on the strengthening of international competitiveness and the advancement of industrial structure. With Korea's entry into the OECD in 1996, the government has further advanced its opening of the capital and foreign exchange market (Kim 1996; Kim and Kang 1997).

In the latter part of 1997, and in the midst of these policy changes, Korea also faced a financial crisis, like several other countries in the region. This crisis, as many pointed out (Grewal 1998; Jolley 1998b; Hahm 1998; IMF 1997) was caused by a combination of external and internal factors. Short-term external financing had been a major source of funding for Korea for some time. This led to rapid increases in short-term debt. The inadequacy of prudential supervision also exacerbated the problems further, creating foreign exchange liquidity problems. A highly leveraged corporate financial structure and the failure of several of the conglomerates (*chaebol*) have also

been identified as other factors which contributed to the financial crisis in Korea

Making matters worse, major terms of trade shocks hit the economy with the collapse of export prices in 1996 and 1997, significantly damaging the corporate sector. A combination of all these factors undermined the financial position of many Korean companies and destabilized financial markets, ending up with a financial crisis in Korea. In an effort to overcome mounting foreign exchange problems and rapid deterioration of the nation's credit standing, the Korean government decided to resort to assistance from the IMF. Together with the IMF program, steps were taken to improve the financial transparency of corporate firms.[9] These developments are beyond the scope of the current study.

5.4 Diversity of Policy Instruments

As noted in Chapter 1, in certain circumstances, such as investments that involve huge initial investments and strategic complementarities, and in the presence of externalities, entry barriers, information asymmetries and so on, market outcomes may often not be optimal. It is widely believed that in such circumstances the situation could be improved with the support of the government. Since governments see these various market deficiencies in many different ways, they take a variety of measures.

Korea, for instance, pursued its industrialization process by simultaneously promoting both export promotion and import substitution industries, while using a variety of policy instruments. These instruments primarily included: (a) protective measures such as import restrictions on competing products, reductions in tariffs on raw materials and ownership controls; (b) measures adopted for achieving optimum production scale, such as restrictions on entry and on capacity expansion, state initiated mergers, coordinated capacity scrapping and or exit and market sharing arrangements and (c) measures aimed towards improving productivity, such as capacity upgrading, encouraging production for export markets, and providing generous incentives and institutional support for technology, R&D and human capital development. How and why such diverse policy instruments were applied in the case

of Korea is discussed in this section, under two sub headings: as import substitution related measures and export promotion and growth related measures. Yet, it is important to note that organising the measures adopted for industrial promotion under these two categories becomes difficult, since Korea simultaneously applied measures for both import substitution and export promotion.

5.4.1 Import Substitution Related Measures

As it is obvious from the discussion of Section 5.3, and Table 5.2, Korea pursued import substitution measures since 1950s, more often simultaneously with export promotion. Yet, the periods between 1950-60 and between 1973-81 were considered to be more biased towards import substitution than other periods. Measures adopted during the latter period will be discussed in the following section along with the industrial targeting.

(a) Measures for Promoting Heavy Industries and Industrial Targeting

As one means of overcoming the worsening trade balance, the initiative towards building up Heavy and Chemical Industries (HCI) came into effect with the introduction of the Heavy and Chemical Industry promotion committee in 1973.[10] The motivation for promoting these industries appeared to be both economic – to develop production capacity for intermediate materials and capital goods – and strategic – to increase defence capability and to serve as a future source for the development of strategic export industries (World Bank 1993; Suh 1986; Yoo 1990).[11] With these objectives in mind, the government of Korea played an intensive role in planning, monitoring and inducing private firms to invest in HCI industries, most of which were referred to as targeted industries.

Successive development plans in Korea specified the targeted industries (see

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[9] For more details see Hahm (1998) and IMF (1997).

[10] Several other reasons such as concern for national security, rising protectionism in industrial countries, the likely erosion of Korea's competitiveness, and some political factors have also influenced the Korean government to apply the HCI policies in the early 1970s (Yoo 1990).

[11] In a press conference, President Park presented "as the goal to be achieved by the HCI policy, exports of $10 billion and per capita GNP of $1000 by 1980. These were considered to be ambitious goals, given the total exports of $1.62 billion and per capita GNP of $318 in 1972" (Yoo 1990, p. 4).

Table 5.3 for targeted industries specified under each plan). The composition of the target set of products changed with time, from unsophisticated products (such as radios) to sophisticated products (such as VCRs); from consumer products (such as colour TVs) to industrial products (such as semiconductors) and so forth. In general, the list of industries that were considered to be suitable for promotion included: (a) petro-chemical industries located in pretrochemical parks, which are covered by the *Petrochemicals Industry Promotion Law*; (b) ship-building industries listed by the *Shipbuilding Promotion Law*; (c) machinery industries listed by the *Machinery Industries Promotion Law*; (d) electronics industries listed by the *Electronics Industry Promotion Law*; (e) steel and related industries listed by the *Steel Industry Promotion Law*; and (f) other numerous industries such as automobiles listed by the relevant laws and presidential decrees (Suh 1981, pp. 21-22). Criteria used for selecting targeted industries were, however, not explicitly clear in the case of Korea. According to the available evidence (Amsden 1989; Yu 1989; Chang 1994), targeted industries were selected on the basis of a number of criteria, namely product life cycles, vertical and horizontal integration, technology spin-offs, market niches, high growth potential and competitive advantage. In the 1990s, targeted products are mainly selected on the grounds of (a) those that require intensive R&D efforts; (b) those that require support for mass production and (c) those where efficiency and productivity have to be increased in order to remain competitive.

These industries were promoted through a number of measures including import protection, preferential treatment, inducing production for export markets and through the measures adopted for achieving optimum production scale. Since the majority of the industries initiated under the HCI drive were characterised as infant industries (in which Korea possess low comparative advantage), it was deemed necessary to protect these industries from their established rivals. Therefore, these industries were largely assisted through the protection from imports in their early stages of development. For instance, in the case of the automobile industry, importing of completed automobiles was prohibited. Once local production met government standards, automobile parts and component items sectors were also protected under a complete import ban.

Table 5.3 Targeted/Strategic Industries in Korea

Period	Industries
1962-66 (First Five Year Development Plan)	Coal, Cement, Fertilizer, Oil Refining Chemicals, Iron and Steel, Machinery
1967-71 (Second Five Year Development Plan)	Iron and Steel, Refined Petroleum, Aluminium, Fertilizer, Soda-ash, Cement, Motor, Automobile, Shipbuilding,
1972-76 (Third Five Year Development Plan)	Iron and Steel, Copper, Lead, Zinc, Cement, Sheet Glass, Pulp, Working, Construction, Farm and Electrical Machinery, Automobile, Shipbuilding, Synthetic Fiber, Fertilizer, Petrochemicals Electronics,
1977-81 (Fourth Five Year Development Plan)	Steel Products, Finished Metal Products, Electronics, Electrical and Non-Electrical Machinery, Shipbuilding, Transport Equipment
1982-86 (Fifth Five Year Development Plan)	Machinery, Automobile, Chemicals, Electronics, Biotechnology; Iron and Steel, Shipbuilding, Aviation Industry
1987- to date (HAN Project – 1991)	Seven high- technology products and seven based technology products are identified as targets (see Table 5. 5 for details)

Sources: Chang (1994, p. 114); Yu (1995, p. 93-94); Amsden (1989, p. 82); Hong (1979, pp. 39-44); Rhee (1987, p. 32).

The targeted industries had priority in acquiring subsidised credits, foreign exchange, state investment funds, preferential tax treatments and other supportive measures including import protection and entry restrictions (see Table 5.2 for details). Setting up of targeted industries was further encouraged by creating huge differences in the incentives for different classes of industries. For example, the marginal tax rate was set below 20 per cent for HCI industries whereas it was around 50 per cent for non-HCI industries (Dollar and Sokoloff 1994).

Also, the targeted infant industries were encouraged to produce for export markets from the inception. Two strategies were implemented for this purpose: industries were primarily encouraged to target developing country markets and they were encouraged to adopt a differentiated pricing scheme. Under this latter policy, for instance, automobile manufacturers were encouraged to set the export price well below the cost of production, while setting prices for domestic consumers at substantial profit margins. Encouraging industries for export production was expected to expose them to international pressure and thereby help them to adapt to

competition.

To realise the potential benefits of economies of scale, firms were often instructed to build plants of efficient production scale. Whenever firms were thought to be smaller than the minimum efficient scale, the state made steps to initiate mergers or limited production to a handful of producers. There are a number of examples of this nature. In the case of automobile industry, the MTI restricted manufacturing of small passenger cars to three primary auto firms: Hyundai, Kia and GM-Korea. These three firms were required to cooperate with each other in developing standardized parts and components and were required to set annual targets (Chu 1994). Likewise, a merger process was applied in industries such as PVC producers, fertiliser, shipping and construction industries until the 1980s (Chang 1994; Amsden 1989; Suh 1986).

Government support was not only restricted to times when businesses were flourishing. When the economy experienced hard times, for example in recessions, the government induced healthier firms to absorb insolvent firms by providing various incentives to avoid business failures. In particular, under the rationalisation program implemented during the mid 1980s, declining industries were assisted through state led mergers, capacity reduction, specialisation and liquidations.[12] As part of the rationalization plan, for example, the MTI ordered Kia to stay out of small passenger car production until 1987 while giving it monopoly power in producing light trucks; trucks over five tons were given to Hyundai and the Daewoo group (Chu 1994). Of the three companies which produced naval diesel engines, one group (Daewoo) was asked to exit while the other two groups (Hyundai and Ssangyong) were forced to split the market into two segments and to specialise (Chang 1994, p. 122). As part of the shipping rationalization program (1983-1985), the government reorganized the industry, determining the number of surviving firms (63 firms into 17 firms), and setting capacity reduction targets for those surviving ones (Kim 1989a, p. 30). If firms refused to accept government initiated measures, the government threatened to withhold financial and other incentives.

[12] Those industries which were subjected to rationalization mainly included heavy power generating equipment, motor vehicles, vessel diesel engines, electronic exchanges, copper smelting, shipping, overseas construction and fertilizers.

In essence, rationalizing declining industries was seen as necessary for Korea to prevent widespread unemployment, and to boost confidence in the industrial market. However, as Kim (1989a) pointed out, these bail out procedures could create a significant "moral hazard". Given the prospect of government rescue in the event of adverse business conditions, firms were more willing to undertake risky strategies. Further, government-imposed industry restructuring placed more emphasis on mergers than industrial exit or conversion, which in turn tended to delay the needed adjustments, resulting in more inefficient resource allocation. Moreover, the troubled firms were mostly taken over by large business groups, contributing to the concentration of economic power (Nam 1992).

Realising these limitations, with the enactment of the *Industrial Development Law* of 1986, the rationalisation programs were designed to place more emphasis on addressing the needs of individual industries. To effectively manage these programs and to improve the industrial support system, as the law implied, the government was expected to intervene in areas where market failure occurred, and in industrial sectors whose international competitiveness was vital to the economy but which were not expected to be competitive if left to market forces. Accordingly, industries which needed technology upgrading and also involved large investments, for example automobiles and heavy construction machinery, were provided assistance on an individual basis either in the form of state led market sharing arrangements, or entry restrictions and subsidies on investment and R&D (Chang 1994; Seong 1997).

Along with this *Law*, attempts were made to phase out declining industries such as textiles, dying, ferro-alloy and fertilizers. As a part of this process, industries such as textiles and dying were encouraged to substitute old equipment with new and automated machinery. To improve the operating ratio of the ferro-alloy industry, two firms were merged to monopolize the copper smelting market, three firms were designated to specialize in manganese steel, and a long-term supply contract with Pohang Steel Company was arranged by the MTI. Further, all these rationalization programs were limited to a three-year period. To avoid unilateral government intervention in the rationalization process, an "Industrial Development Deliberative Council", which comprised experts on industrial policy from the private sector, and a "Deliberation Committee on Industrial Policy", which coordinated views on

rationalization of policy among concerned government organizations, were established. After consulting both the above mentioned council and committee, the MTI drafted a rationalization plan, including special loans, mergers, collusive behaviour, capacity reduction, import restriction and entry barriers (Kim 1989a).

Some economists (Stern 1990, 1995; Cho and Kim 1995) argue that in some respects, such as transforming its industrial sector from one dominated by labour intensive manufacturing to one with substantial capacity in capital intensive products, while maintaining rapid industrial growth and continuing to develop new export markets, the industrial targeting process of Korea has been successful. On the contrary, others (for instance Suh 1986; Yoo 1990; Rhee 1987) consider that the HCI policy drive did not succeed as expected and was a policy mistake. As they point out, excessive incentive schemes in tax, tariff and bank financing led to over investment or investment duplications, and to under utilized capacity, and generated severe distortions and waste in the allocation of investment resources. Further, the HCI drive led to the rapid inflation and a deterioration of economic performance resulting from eroding competitiveness. These deficiencies, they argue, arose partly due to the excessive government intervention while ignoring market principles. The HCI drive and industrial targeting process in Korea provide an example of how government intervention may create both favourable as well as unfavourable effects on the economy.

(b) Measures for Promoting Industrial Structure

Some key characteristics of the Korean economy, such as the oligopolistic industrial structure and vertically integrated pattern of industrial development, developed as an outcome of deliberate measures. Thinking that a handful of large firms might be helpful in penetrating as well as challenging developed country markets, especially the United States and the Europe, Korea intentionally made efforts to promote an oligopolistic industrial structure. For that purpose, take-overs were not only allowed but also encouraged by the government. The collusive behaviour was particularly encouraged in promising industries that needed to increase R&D, to improve quality and to attain efficient production scale, and also to scale down the capacities in declining industries (Chang 1994). Despite these attempts, competition was

encouraged among firms, mostly on the basis of non-price variables such as quality and location.

Vertical integration, the other key characteristic of Korea's industrial structure, was promoted largely by tying up Small and Medium Scale Enterprises (SMEs) to the large scale sector through sub-contracting – instructing the *chaebol* to establish supply and vendor networks. To develop these activities, the *Small and Medium Industry Systemization Law* was enacted in 1982. This *Law* empowered the MTI to reserve certain industry spheres for small and medium size sub-contractors. Also, it instructed *chaebols* to procure designated parts and components through SMEs and not make them in-house, and provided conditions that prevented prime contractors from swallowing up sub-contractors through stock ownership. Additionally, the government imposed certain guidelines on fair trade practices, such as the frequency of payments and the length of sub-contracts. By providing various tax and financial incentives, it encouraged sub-contractors to update their technological know-how. Sub-contracting SMEs were exempted from stamp tax and were granted tax deductions for a certain percentage of their investments in laboratory and inspection equipment, and for the whole of their expenses for technical consultancy. Growth and stability of sub-contractors was further enhanced by the exchange of personnel between prime contractors and sub-contractors and by setting up sub-contracting promotion councils to help SMEs in terms of contractual relationships, arbitrate disputes and the monitoring of contract implementation (Amsden 1989; Westphal 1990; Lall 1996).

Since the early 1980s, the government's stance on favouring large firms was moderated. Instead of promoting large firms, financial incentives for R&D and for marketing and industrial expansion activities were directed towards SMEs. The *Monopoly Regulation and Fair Trade Act* enacted in 1981, introduced certain changes in the prevailing policies. Accordingly, collusive or entry limiting activities of firms, take-overs of competing firms, competition limiting joint activities and unfair trade practices in dealing with retailers or suppliers were banned.

Realising this deficiency, this *Act* was amended in 1986 with stronger restrictions on cross investments between members of the same conglomerates.

Industry associations that would lead to limiting competition were also prohibited. At the same time, more reforms were announced to reduce business concentration. These included the forced sale of 'idle' real estate held by the *chaebols,* the rationalisation of the *chaebols* corporate structure through the forced sale of non-essential subsidiaries, tight control over big business, and stringent supervision of loans given to the *chaebol* (Moon 1994). By the early 1990s, the government announced the Industrial Specialisation Plan under which, by January 1994, each of the top 30 conglomerates had to nominate their 'core' businesses. Through this process it was expected to enhance further specialisation of the *chaebol*, facilitate further growth in key industries, reduce concentration and corporate debt, and consolidate the financial position of the key players in the Korean economy. The response to this new plan appeared to be positive since several companies announced expansion plans within their key areas (McKay and Missen 1995). These included Samsung's announcement of large scale investments in production of non-memory chips, and Hyundai's plan to be one of the top 10 car makers in the world by the year 2000).

(c) Measures for Promoting Small and Medium Scale Industries

Apart from the sub-contracting measures noted earlier, a number of institutional and other supports were initiated for the purpose of promoting SMEs. These mainly included: (a) "Small Industry Centres" were set up in each province for helping and guiding SMEs, improving their management and production activities; (b) the Small and Medium Industry Bank was established for providing financial support, either in the form of equity capital or convertible bonds, for training managers of SMEs and improving their operational activities such as market surveys and feasibility studies and (c) various other institutional facilities were established to undertake research, develop techniques and skills, and provide management services.[13] Government support for SMEs was further extended by granting a collective monopoly over certain products including leather products, shoes, towels and toys to this sector. If large businesses wished to extend their production in any of the products that had

[13] These institutions include, the Korea Rural Industry Development Centre, the Korea Advanced Institute of Science and Technology, the Small and Medium Industry Promotion Corporation and the Korean Production Technology Service Corporation.

been granted such privileges for small businesses, they were required to obtain permission (Kim 1985). Also, under the factory lease system, model plants were built in industrial estates, and were leased or sold to small entrepreneurs. The *Law on Coordination of Business Activities of Small Enterprises* prevented competition between small industries and also between small and large industries (Salazar 1989; Ouh 1986).

5.4.2 Export Promotion and Growth Related Measures

(a) Measures for Fulfilling Financial Needs

Control over the allocation of loanable funds has been one of the most influential tools that affected the pattern of industrial development in Korea in its early stage. This was deemed necessary for Korea, largely because of the scarcity of capital and the underdeveloped capital market. Extensive intervention in the financial sector began in Korea with the interest rate reform in 1965[14] and the nationalization of commercial banks. The National Investment Fund was set up in 1974 to mobilize public employee pension funds and a substantial share of banking funds, and development banks played a key role in fulfilling financial needs of the private sector, especially large scale investments. These steps seemed to have had a significant impact on industrial development, since they mobilised financial resources for productive purposes and allowed the government to determine where, when and how much should be invested in which industries.

In essence, the policies adopted in Korea in relation to the financial sector appear to be different from that of many other comparable countries in several respects. Firstly, through credit policies Korea tried to achieve specific policy goals, in particular promoting exports and strategic industries. For this purpose, provision of finance to target areas was encouraged and was provided at preferential interest rates. As indicated in Table 5.4, Korea kept its interest rates at comparatively low levels for policy loans until the early 1980s. Compared with the rate of general bank loans, the

[14] Interest rates on deposits raised from 15 per cent per annum to 30 per cent with this reform (In-Joung 1989, p. 49).

Table 5.4 Interest Rates on Bank Loans and Inflation Rates in Korea, 1962-1991

Year	General loan	Policy Loans (lending rates)			Curb market rate	Inflation rate
		Export	Machinery Promotion Fund	National Investment Fund		
1962	-	9.13	-	-		18.4
1963	-	-	-	-	52.6	29.3
1964	-	8.0	-	-	61.8	30.0
1965	-	6.5	-	-	58.7	6.2
1966	-	-	-	-	58.7	14.5
1967	-	6.0	12.0	-	56.5	15.6
1968	-	6.0	12.0	-	56.0	16.1
1969	-	6.0	12.0	-	51.4	14.8
1970	-	6.0	12.0	-	49.8	15.6
1971	22.0	6.0	-	-	46.4	12.9
1972	15.5	6.0	-	-	37.0	16.3
1973	15.5	7.0	10.0	-	33.4	12.1
1974	15.5	9.0	12.0	12.0	40.8	30.4
1975	15.5	9.0	13.0	12.0	41.3	24.6
1976	16.0	8.0	13.0	14.0	40.5	21.2
1977	16.0	8.0	15.0	14.0	38.1	16.8
1978	19.0	9.0	20.0	16.0	39.3	22.8
1979	19.0	9.0	11.0	16.0	42.4	19.6
1980	20.0	15.0	10.0	22.0	44.9	24.0
1981	17.0	15.0	10.0	16.5-17.5	36.3	16.4
1982	10.0	10.0	10.0-11.5	10.0	32.8	7.1
1983	10.0	10.0	10.0-11.5	10.0	25.8	5.0
1984	10.0-11.5	10.0	10.0-11.5	10.0-11.5	24.8	3.9
1985	10.0-11.5	10.0	10.0-11.5	10.0-11.5	24.0	4.2
1986	10.0-11.5	10.0	10.0-11.5	10.0-11.5	23.1	2.8
1987	10.0-11.5	10.0	10.0-11.5	10.0-11.5	22.9	3.5
1988	10.0-13.0	10.0	10.0-11.5	10.0-11.5	22.7	5.9
1989	10.0-12.5	10.0	10.0-11.5	10.0-11.5	23.7	5.2
1990	10.0-12.5	10.0	10.0-11.5	10.0-11.5	20.6	10.6
1991*	10.0-12.5	10.5	10.0-11.5	10.0-11.5	21.4	10.9

Notes: Inflation rate - GNP deflator
- Data is not available
After the period 1991, interest rate data are available only under two categories namely, general loans and specialized loans. Interest rates remain the same for both categories after 1991.

Source: Sakong (1993, pp. 34, 244); *Korea Statistical Yearbook,* various issues.

curb market rate and the inflation rate, the privileges enjoyed by policy industries were pronounced during this period. Along with structural reforms introduced in the early 1980s, these interest rate differentials began to disappear. As Table 5.4 demonstrates, by mid 1980 significant differences in interest rates were no longer evident between general loans and policy loans. Nevertheless, the curb market and financial repression continued to exist through the rest of the 1980s.

Secondly, the financial institutions of Korea, especially the commercial banks, were subjected to more extensive interference than in many countries. Financial institutions were required to provide finance to specified sectors, according to the lending criteria set by the government. In cases of bad loans even the decision whether to continue lending or not lay in the hands of government.[15] Moreover, until recent times, the government was directly involved in personnel, budget and other managerial decisions of commercial banks.

Thirdly, the government of Korea has adopted certain measures to avoid funds flowing to what it sees as non-productive investments. For instance, land reform limited large-scale investment in land, while there were no opportunities for making profits through trade and foreign exchange, especially under the Park regime. Attempts have also been made to restrict consumption demand so as to ensure that funds are directed towards investment.[16]

Fourthly, Korea has made deliberate attempts to fulfil their financial needs through borrowing of foreign funds. Korea borrowed heavily from overseas in order to overcome balance of payment crises, to maintain its long-term growth trend and to finance its industries, especially when it began its heavy industrialization programme. To stimulate lending to Korea, the government amended the *Foreign Capital Inducement Law* in 1962 and provided government guarantees to lenders, which eliminated the risks of default and of exchange rate depreciation (Amsden 1989, p. 73). Like other financial measures, capital flows have been tightly regulated in Korea

[15] In terms of supervising and regulating all the activities of the banking system, the Ministry of Finance played a direct role while the Economic Planning Board was indirectly involved in deciding the criteria for granting bank loans to prioritised sectors.

[16] To repress consumption demand, restrictions were imposed on providing consumption loans to the banks; foreign holidays and luxury goods were banned.

with a view to maximizing the efficiency of foreign borrowing in terms of both cost and use. For non-financial private corporations, foreign borrowing has mainly been confined to financing imports of capital goods and raw materials. For financial sector corporations, foreign borrowing has been restricted to funds for re-lending to firms in foreign currencies (Nam 1992, p. 10). The value of external debt has not become a burden, since most of the overseas loans were on a long-term basis and export growth was sufficient to pay them back, until the recent financial crisis in late 1990.

Overall, though these policy measures were claimed to be instrumental in achieving rapid industrial growth, they impeded the development of an efficient banking system. Banks were plagued with substantial amounts of non-performing loans. These non-performing loans have been a continuing problem for the banking sector in Korea, since these lending institutions had little incentive for serious credit evaluation or ex-post monitoring due to excessive interference from the government. Concern over instability in financial markets further led to delay in taking appropriate action against these non-performing loans. Moreover the uncertainty surrounding the government's continuing role as risk partner failed to eliminate the 'moral hazard' problem. The restructured firms were reluctant to reduce their capacity, and tended to pursue risky strategies in anticipation of another government rescue in the case of failure (Nam 1992).

Faced with this situation, and with the objective of promoting competition and efficiency, since the early 1980s several reforms have been introduced in the financial sector. As part of this reform process many restrictions on bank management were lifted; the government divested its equity shares in all nationwide city banks, transferring ownership to private sector; entry barriers were lowered and most preferential interest rates applying to various policy loans were abolished; and financial intermediaries were allowed to determine their own lending rates (Nam 1992, pp. 10-20).

(b) Measures for Promoting Technology Development

At the beginning of its industrialization process, the technological status of Korea was not much different from that of a typical developing country. Nevertheless, Korea has

been able to achieve considerable progress in its technological status over the last two decades. Achieving such progress in technology development was partly possible for Korea due to its concerted policy measures. In essence, these policy measures could be viewed differently from that of comparable countries owing to Korea's restrictive policy stance towards foreign direct investment (FDI), its concerted efforts towards maximizing the potential benefits of FDI, and its emphasis on other alternative comprehensive measures to develop indigenous technology.

Though Korea encouraged FDI, as did other developing countries, as an alternative for developing its technology status, it adopted less liberal policies. It neither encouraged FDI at a large scale nor promoted Free Export Zones,[17] particularly in the early stages. Until the late 1950s, FDI, especially foreign majority ownership, was not allowed. As a result, FDI has played a relatively minor role, except in electronics. With the introduction of the *Foreign Capital Inducement Promotion Act*[18] of 1960, this policy stance though was relaxed, the resulting liberal policies did not last for long. Anticipating a potential surge of Japanese investment with the resumption of diplomatic relations with Japan, the Korean government introduced various measures to regulate both the quantity and quality of foreign capital. Subsequently, the *Foreign Capital Inducement Act* of 1966 regulated both foreign licensing and FDI. Further, the *Law of Importation of Foreign Capital* specified that FDI should be restricted to priority industries, infant industries, industries using large amounts of imported raw materials, consumer (luxury) goods industries, polluting industries and agriculture and fishery (Chang 1994).

Since the early 1970s, with the hope of mitigating the perceived adverse effects of FDI to the domestic economy and of maintaining considerable independence both in terms of ownership and the absorption of technology, Korea began to place emphasis on other technology enhancing methods such as joint ventures, importing technology and technology licensing. Consequently, from 1973 onwards, joint ventures were given greater priority than wholly owned foreign firms.

[17] Korea has established two free trade zones, namely Masan in 1970, in which the predominant industry is electronics and electronic goods and Iri in 1974, where textile enterprises are predominant (Rhee, Katterbach and White 1990).

[18] Under this act, for the first time various incentives including equal treatment with domestic firms, tax holidays, guarantee of profit remittances and withdrawal of the principals, and tax incentives for

At the same time very specific 'General Guidelines for Foreign Direct Investment' were introduced. These guidelines were specifically focused on three areas: project eligibility, foreign ownership, and investment scale.

Under the project eligibility criteria certain projects such as: (1) projects which would disrupt domestic demand and supply of raw materials and intermediate products; (2) projects which compete in overseas markets with domestic firms; (3) projects which aimed solely at financial support for existing domestic enterprises and (4) projects which aimed solely at profit from land use, were designated as non-eligible projects for foreign direct investment.

Under the foreign ownership criteria, the foreign participation level was basically limited to 50 per cent, except in the case of: (1) entirely export oriented projects which did not compete with domestic firms in overseas markets; (2) technology intensive projects which produced or induced production of important exporting or import substituting products; (3) multinational projects which invested only in the form of wholly owned subsidiaries in other countries; (4) projects which contributed to regionalization of domestic industrial structure and which were beyond the capacity of domestic investors, due to the large capital or advanced technology involved; (5) projects from a country which was expected to make increased investment in the future; (6) projects undertaken by Korean residents abroad and (7) projects in Free Export Zones and some other specific Industrial Estates designated by the government (Koo 1982, pp. 7-8; Lee 1987, pp. 20-21).

In addition to the above noted eligibility and ownership criteria, a local participation of more than 50 per cent was required for projects which were: (1) purely labour intensive; (2) purely bonded processing; (3) dependent on domestic resources for major raw materials and (4) oriented toward local market sales. Along with these requirements the minimum amount of investment was also set in 1973. This requirement initially began at US$ 50,000 and was gradually raised to US$ 500,000 by the end of 1970 (Koo 1982, p. 8).

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technology licensees were provided to foreign investors (Koo 1982, p. 4).

This restrictive policy stance began to change, however, in the early 1980s. Realising the potential benefits of promoting more competition in the domestic market, contrary to former policies, a number of measures were initiated to stimulate FDI. Liberalization measures introduced in the 1980s opened many new industries to foreign investors. The new (revised) *Foreign Capital Inducement Act*, which came into effect in 1984, introduced new guidelines for FDI. Accordingly, a positive list of industrial activities open to FDI and a negative list of industries prohibited for or temporarily closed to foreign investors were introduced. The negative list system demonstrated the government's intention to eventually open all domestic markets to foreigners. At the time of the introduction of this *Act*, the negative list included 297 of the 957 industries listed, leaving 660 industries open to FDI. Later, the government gradually reduced the number of industries on the negative list (Yoo 1989; Lee 1988). Prior to the introduction of the *Foreign Capital Inducement Act* foreign ownership was restricted to less than 50 per cent, except for firms established in the free export zones. However, along with this *Act* foreign equity sharing up to 100 per cent was allowed for projects that involved high levels of technology and projects that involved a substantial level of exports.

With the introduction of an automatic approval system and reducing restrictions on policies regarding technological licensing, further attempts were also made to stimulate FDI in the 1980s. For example, projects where foreign ownership was less than 50 per cent, the amount of foreign investment was less than US$ 1 million and the projects that were not on the negative list were given automatic approval by the Ministry of Finance without consulting other ministries concerned (Yoo 1989; Lee 1987). Certain exemptions were granted to foreign enterprises from income, corporate and capital gains taxes. Outward remittances of dividends and the repatriation of capital were also guaranteed. Such a drastic reversal of government policy, especially with regard to FDI, was mainly introduced by the government with the primary purpose of promoting competition with domestic firms, enhancing efficiency and productivity, and promoting technological development of sophisticated industries.

In addition to the initial restrictive policy stance, Korean policy measures are often considered to be special and to differ from those of many other countries in

terms of the strategies adopted for minimizing the ill effects of FDI. Though countries largely encourage FDI, as an alternative measure for promoting technological status, in general FDI is criticised on the grounds of certain ill effects such as reinforcement of dualism, introduction of inappropriate products and or technologies, weakening of domestic entrepreneurship and so on. With the hope of minimising such ill effects, Korea adopted certain strategies. The government of Korea tried to maximize the contribution of FDI, by allowing it only when the purpose of the investment was deemed compatible with the objectives of the development plans. For instance, though the majority of infant industries were, at least initially, dependent on FDI, the government was influential in admitting new entrants, which were granted entry through the decisions regarding the development of related lines of activity, and also enforcing them to adapt to national priorities. In this process the Government of Korea paid more attention to the quality rather than to the quantity of investment flows.

To maximize the potential benefits of FDI, further efforts such as tight investment screening and extensive government reporting requirements and other control measures were also applied. Accordingly, before the FDI projects received final approval, every project had to be approved by the Ministry of Finance after consultation with various other relevant ministries. That process not only involved a considerable amount of time but also was subjected to tight investment screening. Carrying out this type of task was possible for Korea, because its highly skilled personnel were capable of identifying the technical feasibility of FDI projects. In addition to these selective and quality ensuring measures, to protect domestic producers, competition with domestic firms was seldom allowed in both domestic and international markets. Along with these measures, maintaining a minor role in FDI was partly made possible by the structure of the industry – the instrumental role played by the large private conglomerates in technology development in the country (Koo 1982; Lee 1987)

Apart from these measures, purchasing foreign technology and importing capital goods were encouraged through various tax incentives.[19] Firms were

[19] Those tax incentives included deductions on transfer costs of patent rights and technology import

instructed to obtain the latest equipment and technology. Technology licensing, another popular form of technology transfer in Korea, was associated with mature stages of technology in the advanced countries, mainly geared towards obtaining patent rights (about half of the technological licensing), and acquiring brand names to penetrate import barriers (Lee 1988, p. 195). Even those technological licenses were allowed only if local technological capabilities were not strong enough in that particular industry. To strengthen domestic buyers and to maximise the participation of local consultants in engineering contracts to develop basic process capabilities, the government directly intervened in the negotiation of major technological contracts (Lall 1996).

Contrary to most other developing countries, which rely heavily on FDI and joint ventures to satisfy their technological requirements, Korea looked for alternative avenues to promote technology development. As part of this process, for instance, in the 1980s Korea encouraged the OEM (Original Equipment Manufacture) and ODM (Own-Design and Manufacture) systems. These systems, which operated as an alternative form of joint venture, helped Korean firms to train engineers (through strenuous in-house efforts and on the job training) to select equipment, supply materials and capital goods, and supply production and design technology. In particular, these systems were helpful in building the skills of Korean firms in consumer electronics, computers and microwave ovens. Under the conditions imposed by the OEM and ODM, production had to be the highest quality at the lowest price. Initially Samsung and others invested heavily for little or no return, just to win their first small export orders (Hobday 1995, pp. 63-68).

Informal technology transfer was another popular method widely applied in Korea for obtaining technology transfer. This included the hiring of foreign engineers and independent consultants, and the recruiting of locals trained in foreign multinational companies. These expatriates lived and worked in Korea as employees, helping to resolve technical problems. Short-term consultants, mostly obtained from Japan and either retired or still in the permanent employment of a Japanese enterprise, provided a valuable service, since they were free from the constraints of teaching firm

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fees, and tax exemptions on the income from technology consulting and from foreign engineers (Lall

to firm technology transfer techniques (Amsden 1989). In addition to these measures, Korea had been successful in absorbing technology while using links with foreign buyers of exported products (Westphal et al. 1981). In adapting and modifying local technologies according to their specifications, more often foreign buyers tended to offer advice and assistance, and sometimes even made regular visits to inspect facilities in the factories, provide local companies with blueprints and specifications, and with information on competing goods and production techniques, as well as feedback on design, quality and performance. With the expansion of *chaebol* activities, overseas investments became another form of technology transfer. For example, Samsung and Hyundai purchased a number of high technology firms, and set up laboratories abroad. This enabled them to enhance their technological capabilities by developing new products or processes jointly with a foreign partner and also to acquire skilled engineers and equipment (Hobday 1995). By setting up Science Research Centres and Engineering Research Centres at universities around the country to support R&D activities, facilitating common utilisation of advanced R&D facilities by smaller private firms, constructing science towns (Daeduk Science Town, Kwngju Science Town), and organizing the quarterly Presidential conference for the Promotion of Science and Technology to facilitate effective inter-ministerial coordination, further measures were taken to stimulate technology development (Lall 1996; Yu 1995).

In addition to these comprehensive measures, Korean efforts towards developing technology could also be viewed differently from others because of its heavy emphasis on improving indigenous technology. Realising the potential danger of relying on foreign technology and also with a view to maintaining independence, by adopting certain strategies including unpacking imported technology, and copying foreign products through 'reverse engineering', Korea made vigorous attempts to improve its indigenous technological status (Jenkins 1992a). For example, to reach its present level of technology Samsung underwent a learning process incorporating several stages. Firstly it began production in the electronics industry while mastering simple assembly techniques with imported parts, sourcing some of the components from suppliers, or modifying the engineering and design of imported products. Then it used reverse engineering processes to manufacture products through in-house

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1996).

efforts, without direct reliance on foreign firms. Later, it was able to apply the reverse engineering method process innovatively (Yu 1989).

In this process, like Japan, Korea demonstrated her ability to adapt and absorb technological needs according to domestic requirements. This ability was proven in the areas of choosing which technologies to import, of adapting foreign technologies to local conditions and of generating new technologies domestically. Demands made on foreign capital good suppliers for thorough training and skills transfer (O'Conner 1995), and compilation of a database on sources and prices of technology supply further strengthened Korea's ability to build her technology base. Technology diffusion was further advanced by the Korea Institute for Economics and Technology, which collected, processed and disseminated scientific and technical information to industry (Lall 1996).

(c) Measures for Promoting Human Resources

As part of this indigenous technology development process, the Government of Korea actively promoted human capital by stimulating the overseas training of Korean managers and engineers. More importantly, the government vigorously encouraged the education of high level technical manpower by setting up institutions such as the Korea Advanced Institute of Science and Technology (KAIST) at the postgraduate level and the Korea Institute of Technology (KIT) at the undergraduate level (Lall 1996). The former was under the control of the Ministry of Science and Technology (MOST) and its faculty and students were fully supported by the government. Moreover, in 1974, the government enacted a law that made in-plant training compulsory for all industrial enterprises with 300 or more workers. Under this law, enterprises could either establish vocational training institutes and trained their own skilled workers or they were levied costs to train such employees. In this endeavour, the government even determined the number of workers to be trained by each firm (Kim 1989b). Larger firms showed not only a positive response to in-house training but also made steps to establish their own formal secondary schools within their own premises.

To strengthen indigenous technology capabilities, a number of institutional

supports have also been initiated in Korea since the inception of its industrialization process. Building an indigenous technology capability started with the establishment of the Korea Scientific and Technological Information Centre (KSTIC) in 1962. Its main activities included the international transfer of scientific knowledge by collecting, processing and disseminating scientific and technical information. The Korea Institute of Science and Technology (KIST), initiated in 1966, contributed to technological development by carrying out applied research, including project feasibility studies, technical services for small and medium scale industries and engineering studies on a pilot plant scale. Additionally, KIST was helpful to industries through pioneering new products and processes, and adapting and improving foreign technologies. The Ministry of Science and Technology (MOST) set up in 1967, was responsible for formulating basic policies on research and development, international technical cooperation, the development of research organizations and resources, and the creation of a favourable societal climate for science and technology promotion. These institutional supports were further strengthen through the establishment of specialised research institutes related to machinery, metals, electronics, nuclear energy, resources, chemicals, telecommunications, standards, shipbuilding and marine sciences (Lall 1996).

(d) Measures for Promoting R&D

Realising the potential benefits of innovation, and as an alternative avenue to reducing the dependence on Japanese firms, policy measures stressed the importance of promoting R&D since the early 1970s. For this purpose, the *Technology Development Promotion Act* was enacted in 1973 and later amended in 1977 and 1981; generous tax incentives and finance facilities were introduced as prime motivators for stimulating R&D activities. Among others, for example, firms which spent on R&D were entitled to claim 10 per cent of current R&D expenditures as tax credits and special accelerated depreciation for capital expenditure used in R&D. They were also permitted to set aside reserves for future R&D, provided that it was spent on R&D projects within four years (see Table 5.2 for details) (Yoo 1989; Lall 1996; Rhee 1987).

In addition to generous tax incentives, R&D was promoted through generous

financing schemes that involved both grants and loans. Accordingly, the Designated R&D Program, launched in 1982, supported private firms undertaking research in core strategic technology development projects in the industrial area which were approved by the MOST. It funded up to 50 per cent of the R&D costs of large firms and up to 80 per cent for SMEs. The Industrial Technology Development Programme, started in 1987, subsidised up to two-thirds of the R&D costs of joint projects of national interest between private firms and research institutes. The Highly Advanced National Project (HAN), initiated in 1992, supported the development of specific high technology products and core technologies (see Table 5.5 for details) considered essential for the economy in which Korea wanted to achieve an independent innovative base. For this, a separate fund, the Science and Technology Promotion Fund, was established in 1993 to provide finance for firms and research institutes undertaking the HAN projects (Song 1995).[20] Most of these funded projects were conducted jointly by industry, public research institutes and the government, and covered activities such as semiconductors, computers, fine chemicals, machinery, material science, telecommunications, energy and plant system engineering (Lall 1996; Hobday 1995). The response to these incentives was remarkable, with large firms keen to establish their own R&D laboratories. Private sector participation in establishing R&D laboratories, for example has increased from 12 in 1976 to 122 by 1983 and to over 1000 by 1991 (Kim 1989b; Yu 1995).

Institutional support was further strengthened by enacting a number of laws: the *Science and Technology Promotion Law* of 1967, defined the government's role in promoting science and technology, and the *Technology Development Promotion Law* of 1972, which specified the incentives to private firms for innovative activities and for upgrading industry capabilities.[21] The prime objective of these incentives was to

[20] Besides this, two other funds: the Industrial Development Fund, provided low interest loans for long-term productivity improvement and technology industries, and the SME Foundation Formation Fund of 1994, supported technology development and environmental investment by smaller firms. The Korea Technology Development Corporation and commercial banks provided necessary finance while the Korea Technology Credit Guarantee Fund offered credit guarantees for loans made to help firms develop or commercialise new technology.

[21] Other legislative measures included, the *Science and Technology Development Promotional Law* (for private sector R&D institutes), the *R&D Consortium Law for Industrial Technology Promotion*, the *Government Supported R&D Institutes Law*, the *Special Provisional Law for Structural Adjustment and Management Stability of Small and Medium Business*, the *Industry Development Law* (for support of basic industrial technology), the *Substitute Energy Development Promotional Law*, the *Software Development Promotional Law*, the *Genetic Engineering Promotional Law*, the *Aerospace Industry*

Table 5.5 Products Identified under the HAN Project in Korea

Product Oriented Technology Development Projects
1. For the electronics industry, develop 256 megabit DRAM chips by 1996 and 1 gigabit DRAM chips by 2000
2. For the telecommunications industry, develop an Integrated Services Digital Network (ISDN) using ATM digital switching system
3. For the consumer electronics industry, develop high-definition TV (HDTV) receiver technology by 1993 and also develop flat panel display technology by 1997
4. For the automobile industry, develop a battery operated passenger car by 1996
5. For the computer industry, develop an artificial-intelligence-based computer capable of performing two-way voice translation by 2000
6. For the fine chemical industry, develop one or two new antibiotic materials by 1997
7. For the mechatronics industry, develop a computer-integrated manufacturing system (CIM) by 1996, and also develop an intelligent manufacturing system (IMS) by 2000
Base Technology Development Projects
1. In the new material area, acquire technologies related to electronics, information and energy
2. In the machinery area, acquire technologies related to transportation, machinery and critical parts and components
3. In the bioengineering area, acquire base technologies related to functional biomaterials
4. In the environmental area, acquire base technologies related to environmental control and preservation
5. In the energy area, acquire base technologies related to highly efficient, clean energy systems that will affect the industrial structure
6. In the atomic power area, acquire base technologies related to the next generation nuclear reactor that will be used for the supply of stable energy, replacing fossil materials
7. In the human engineering area, acquire "high touch" technologies that will enhance the quality of life in post-industrial society

Source: Yu (1995, p. 93-94).

Development Promotional Law, and the B*asic Law for Oceanology Development.* These laws were aimed at treating target technologies differently from others in terms of fiscal and financial support.

Table 5.6 Major Contents of Seven Major Promotional Laws in Korea

Major contents	Industry						
	Machinery	Electronics	Fabric	Iron & steel	Non-ferrous metal	Petro-chemical	Ship building
(Year of enactment)	1967	1969	1979	1970	1971	1970	1967
Promotion							
Regulation of incorporation (entry)	x	x	x	x	x	x	x
Regulation of facilities							
Setting up facility standards	x						x
Approval and coordination of expansion			x	x		x	
Encouraging use of domestic facilities	x	x					
Production regulations							
Regulation of materials imports				x	x		
Production standards and inspection	x						x
Reporting and inspection		x	x				x
Industrial Rationalization							
Rationalization program	x	x	x			x	x
Joint R&D project		x					
Replacement of old facilities			x				
Technological Assistance							
subsidizing R&D activities				x	x		
Contents of Assistance							
Special purpose fund	x	x	x		x		
Financial assistance	x		x		x		x
Subsidy							
Direct subsidisation	x						
Reducing public utility rate	x						
Tax preferences							
Special depreciation	x				x		
Reduction and exemption	x						
Special industrial complex	x	x	x			x	
Administrative assistance							
Facilitating overseas activities		x		x			
Purchase of raw materials				x	x		
Business association	x	x	x				x

Source: Ministry of Trade and Industry (cited in Kim 1989a, p. 34).

reduce the cost of foreign technology imports and of industry's in-house R&D work by allowing reduced tariffs on the import of R&D equipment. Further, the *Engineering Services Promotion Law* of 1973 was devoted to promoting the development of local engineering capabilities by protecting local markets, as well as by enforcing performance standards on local engineering firms. The *National Technical Qualification Law* of 1973 promoted the status of professionals in technical fields by a system of examination and certifications. The former stressed that where possible all local engineering projects should be given to local firms, and overseas firms would be given opportunities only if local firms were not capable enough. Even in the overseas firms' operated projects, local firms were to be given opportunities to participate. These policies indicated the national interest of promoting engineering capabilities (Kim 1989b; Yu 1995; Lee 1986b).

In addition to this, to promote specific industries, which primarily included motor vehicle, ship building and electronics, several laws and other measures were introduced (see Table 5.6 for details). These laws provided a basis for long-term plans in relation to market, production and technology development. To promote the electronics industry, for example, the following measures were taken: the *Electronics Industry Promotion Law* was enacted in 1969; an industrial estate for the production of semi-conductors and computers was established and the Electronics and Telecommunication Research Institute was set up to promote technology (Amsden 1989; Lee 1986b).

The R&D investments enabled the *chaebol* to develop some new products and to reduce their dependence on OEM and licensing in some areas. More importantly, in-house R&D enabled some firms to negotiate strategic partnerships on a more equal footing with overseas leaders of technology. Although the *chaebol* were able to narrow the gap between themselves and the market leaders through a painstaking, incremental process which accelerated rapidly during the 1980s, much corporate R&D was devoted to acquiring and assimilating foreign technology, while innovation was concerned with continuous improvements to processes and product designs, rather than the generation of radical new products through basic research (Hobday 1995).

(e) Measures for Promoting Marketing Networks

As a late industrializing country, it was necessary to strengthen Korea's marketing networks, especially with developed countries. The OEM system, in which firms produce a finished product to the precise specification of a foreign firm, enabled Korean firms to export large volumes of goods under foreign brand names and use foreign firms' distribution channels. To promote marketing, especially to create brand awareness abroad, *chaebol* themselves advertised widely in most of their main markets. Building up connections with foreign buyers was further enhanced by the Korean Trade Promotion Corporation set up in 1962, and was expanded to about one hundred international trade centres by the early 1980s, through the initiation of contacts, providing product samples and company information (Hobday 1995; Lall 1996).

5.5 Conclusion

South Korea was not different from a typical developing country, where the economy was primarily based on subsistence agriculture, until it began its industrialization process in the late 1950s. With meagre resources and a limited industrial base, the structural transformation was undertaken with careful planning, which always aimed to achieve industrial self--sufficiency.

The incidence of industrial policies examined in this chapter suggests two important points that may be valuable for assessing the potential outcome and impact of industrial policies. Firstly, in its efforts towards overcoming supposed market deficiencies, the Government of Korea applied diverse measures. The measures applied in Korea, though having some affinities with those of Japan, were however different from that of most other countries at similar level of development. Policy measures – such as the measures undertaken for building an oligopolistic industrial structure, for promoting an optimum production scale, for promoting an indigenous technological capability, for maximizing potential benefits of foreign direct investment and technology transfer and for providing finance – are in many respects not only unique to Korea but also illustrate how different social, economic and political circumstances led the Government of Korea to apply a variety of measures.

Secondly, another related, and important point provided by the discussion of the incidence of industrial policies in Korea is that the extent, form and the intensity of policy applications depend on country-specific factors, and also on the changing social, economic, political and technological developments faced by the economy, in addition to the nature of the market deficiency. The examination of the incidence of industrial policies in Korea demonstrates how many of the country-specific factors, for example historical factors such as the Japanese occupation, American aid and many other factors such as the efficient bureaucracy, the autonomy in decision making, the resilient private sector, clearly outlined objectives and strict policy guidelines, have been influential in industrial sector development.

6. Diversity and Incidence of Industrial Policies in Malaysia, 1960-1997

6.1 Introduction

By the time Malaysia gained independence in 1957, it had inherited a dualistic economy – an externally oriented primary production sector centred on the mines and plantations which mainly used foreign capital, and a subsistence economy. Like other developing countries, it was largely dependent on a limited range of exports, primarily rubber and tin. There was virtually no industrial development, except for a few processing industries. However, due to the relative prosperity generated by the resource economy, there was not much interest in developing the industrial sector, even after independence, except the incentives provided under the Pioneer Industries Ordinance of 1958 and the measures introduced by the Federal Industrial Development Authority which was set up in 1965,

When the level of export income obtained through primary exports began to deteriorate by the mid 1960s, Malaysia realised that relying on that income was no longer viable. Moreover, there was strong pressure from the local community for government intervention in economic activities, due to the predominance and growing importance of the Chinese community.[1] As part of a strategy to address these pressing needs, Malaysia took an interest in promoting manufacturing industries by the late 1960s (Bowie 1994). The initiative for increasing the contribution of industrial production became clearly evident after 1971, with the introduction of the New Economic Policies (NEP).

Against this background, as a late industrializing country, the industrial as well as economic progress achieved by Malaysia over the past few decades has again been quite remarkable. As can be seen from Table 6.1, the manufacturing sector, both in

[1] Malaysia has three main ethnic communities: indigenous *bumiputeras*, immigrant Chinese and Indians, and they represent 48, 36, and 9 per cent of total population respectively, by the early 1990 (Bowie 1994).

terms of value-added and exports has made a significant contribution to the economy of Malaysia. As the data indicate (column 5), manufacturing sector value-added as a percentage of GDP was relatively small in comparison with the figure for the agricultural sector in 1960. Nevertheless, the manufacturing sector has been able to significantly increase its share over the past few decades. Despite a sluggish growth record in early to mid 1980s, the value-added contribution of the manufacturing sector surpassed that of the agriculture sector by the early 1990s.[2] The manufacturing sector has also witnessed a success in term of exports. As the data in Table 6.1 (column 7) illustrate, manufacturing sector exports accounted for nearly 5 per cent of merchandise exports in 1965. With continuous progress, manufacturing exports accounted for nearly 75 per cent of merchandise exports in 1995, indicating a nearly fifteen-fold increase in their share over three decades.

Table 6.1 Economic Indicators of Malaysia, 1960-1995

Year	GNP per Capita ($US,1987)	GDP (% growth)*	Manufacturing Value-Added (% growth)*	Manufacturing Value-Added (% GDP)	Agriculture Value-Added (% GDP)	Manufacturing Exports (% merch.exp)	Manufacturing Exports (% growth)*
1960	-	-	-	7.7	33.3	-	-
1965	-	-	-	9.1	27.9	5.2	-
1970	967	4.5		11.9	28.5	6.5	6.2
1975	1215	6.0	8.9	16.9	28.0	17.3	5.6
1980	1627	6.2	8.0	20.6	21.9	18.8	6.4
1985	1757	3.7	4.2	18.5	19.3	27.2	7.3
1990	2199	6.5	12.0	25.7	18.7	53.8	12.1
1995	2937	7.0	10.4	32.5	13.0	74.7	11.6

Notes: - data not available.

* Five Year Average (data are in constant US$, 1987 prices).

Source: World Tables, World Bank, ANU.

Similarly, its recent economic growth record has enabled Malaysia to be recognized as one of the fastest growing economies in the world. As the figures in Table 6.1 (column 3) suggest, in general Malaysia has maintained positive and satisfactory economic growth during the last three decades. Except for sluggish

[2] The sluggish manufacturing growth in the mid 1980s has been attributed to the global recession, the crash of the electronics industry due to global overcapacity, and the appreciation of the ringgit.

growth records evident in the mid 1980s, overall, its rate of economic growth is stable and remained around 6 per cent. Equally impressive results are also reported in terms of per capita income. As the data in Table 6.1 indicate GNP per capita was US$ 967 in 1970, in 1987 prices. It had recorded more than a three-fold increase by 1995. All in all, all the performance indicators in Table 6.1 show very strong performances since the late 1980s.

Several studies (Fong 1989; Brown 1993; Petri 1993; Crouch 1994; Ahmad 1990) have attributed this overall economic and industrial progress to a combination of factors, including: (a) the government's commitment and development policies, particularly industrial policies; (b) overall stability of its socio political environment – continuity in government policies despite the changes in political leadership; (c) vast natural resources and (d) favourable external demand for manufactured exports.

Like the previous chapter, the main objective of this chapter is to explore the ways in which the government assisted in industrial promotion in the economy of Malaysia over the period 1960-1997. The practical experiences of industrial policy applications in Malaysia covered in this chapter will provide valuable insights as to how and why diverse policy instruments and policy initiatives were applied in practice, in their efforts towards improving economic outcomes in areas where market deficiencies which perceived as occurring. This chapter is organized in the following manner. Section 6.2 includes a brief review of various country-specific factors, such as the objectives of industrial policies, historical factors and industrial structure, that could possibly influence the outcome of industrial policies. Section 6.3 reviews major policy changes over the period 1960-1997. Section 6.4 outlines the diverse policy instruments applied in Malaysia, under two subheadings: import substitution related measures, and export promotion and growth related measures.

6.2 Diverse Country-Specific Factors

As noted in Chapters 1 and 2, the situations where government can assist in improving the economic outcomes may vary from country to country, depending on the nature of deviations from the market paradigm. The form and extent of government assistance

may further depend on certain country-specific characteristics. As in Chapter 5, some of the important country-specific factors that could have impact on industrial policy outcomes will be briefly reviewed in the following section.

6.2.1 Objectives of Industrial Policies

Prior to the introduction of the New Economic Policies (NEP), addressing domestic market needs was the main driving force behind industrial growth in Malaysia. Beginning with the NEP and the First Outline Perspective Plan (OPP1) in 1971, policy makers were mainly concerned with redressing social imbalances (alleviating poverty), and removing ethnic identification of an economy, specifically with stimulating Malay (*bumiputera*) participation and increasing their share in terms of income, employment, and ownership.[3] The NEP's explicit objective of wealth redistribution continued to be more important than the economic growth objective even in Malaysia's Five Year Development Plans – until the Third Five Year Development Plan (1976-80). Under the guidelines of the NEP, manufacturing industries were considered as major sources of: (i) national economic growth; (ii) employment growth; (iii) *bumiputera* participation; and (iv) regional growth and balance (Taylor and Ward 1994b; Islam and Chowdhury 1997).

This strong presence of the NEP tended to diminish somewhat after the recommendations of the government's two commissioned studies, namely the Malaysian Industrial Policy Studies and the Industrial Master Plan (IMP). These studies evaluated the achievement of the NEP and the existing tax and tariff incentives (Edwards 1992b). Along with these recommendations and with political change in 1981, Malaysia established a firm commitment to economic growth. The Industrial Master Plan (IMP), introduced for the period of 1986-95, can be considered as a major turning point in the industrial promotion process in Malaysia, since it focused on forming government policies towards the development of the manufacturing sector with more specific objectives. Measures specified by the IMP included: promoting active investment through incentives; stimulating foreign investment; promoting

[3] New Economic Policies were clearly outlined in the Second (1971-75) and the Third (1976-80) Five Year Development Plans.

export led industrialisation with emphasis on employment; promoting high value-added product mix and foreign exchange savings; promoting resource based industries; strategic utilisation of Free Trade Zones (FTZs) and Licensed Manufacturing Warehouses (LMWs); promoting small scale industries; dispersal of manufacturing firms to less developed areas; and promoting *bumiputera* participation (UNDP 1985).

The IMP has been further responsible for initiating several other major changes in relation to industrial policies. For the first time in its industrialization process, Malaysia placed an emphasis on developing specific manufacturing sub-sectors which included both resource and non-resource based sectors. Departing from the limited objective of encouraging industrial sectors for fulfilling domestic market needs, under the IMP industrial policy instruments have been focused on promoting industrial linkages, exports and human resources. Further the IMP stressed the significance of reviewing promoted sectors continuously, and rationalising and restructuring industries which showed evidence of declining competitiveness. The second IMP which is planned for the next decade, in addition to the specific objectives of the first IMP, as Lall (1996) noted, will emphasise upgrading certain critical factors that are required for further industrial development such as skills and training, technical support finance and quality improvement, and more targeted import protection (Islam and Chowdhury 1997; Brown 1993).

The subsequently introduced National Development Policies (NDP) and the Second Outline Perspective Plan of 1991 (OPP2), have further stressed the importance of having more commitment towards economic growth and also carrying out industrial policies on specific guidelines. Consequently, the government dropped all limits on minimum percentage of *bumiputera* participation in approved projects. Recognizing the shortage of Malays with relevant management and technical qualifications, the NDP, in conjunction with the Fifth (1986-90) and the Sixth (1991-95) Five Year Development Plans, stressed the importance of promoting human resources. The importance of technology and R&D development were stressed in the Action Plan for Industrial Technology Development (APITD) introduced in 1990. With a view to reducing the dependence on foreign investment and technology, the

Seventh Five Year Development Plan (1996-2000), in addition to placing emphasise on technical and vocational skills training, stressed the significance of investment in R&D capabilities. With these policies Malaysia is aiming to become a 'developed nation' (vision 2020) by the year 2020 (Brown 1993; Islam and Chowdhury 1997; Salih et al. 1993; Lim and Nesadurai 1997).

In summary, fulfilling domestic market needs had been the major motive of promoting industrial activities in Malaysia until early 1970s. The prevailing policies changed considerably after 1971 with the introduction of NEP, since it has placed an overwhelming emphasis on achieving social equity at the expense of economic growth. A major turning point in the industrial history of Malaysia began with the introduction of the IMP in the mid 1980s. Since then policies have been directed towards achieving more specific objectives such as: (a) increasing exports; (b) promoting foreign direct investment; (c) increasing value-added and (d) achieving economic growth. Together with these objectives, promoting human resources and developing technology status have been added to the policy agenda since the early 1990s.

6.2.2 Historical Factors

Except for a few processing industries inherited from the colonial rule, historical factors were not as favourable to industrial development in Malaysia as they were in Korea. Under the British colonial system, though the plantation sector was significantly developed, the colonial government was reluctant to give any preference to domestically produced manufactured goods, predicting that such efforts would create unfavourable effects. These effects included reducing the import duty revenue and raising the domestic prices of some of the goods consumed by plantation workers, thereby adding upward pressure on wages and reducing the profits of the estates. Thus, with little support from the colonial government, at the time of the independence Malaysia remained an economy largely dependent on the production of primary commodities (Edwards 1992b).

Yet, at one level, the long and continuous socio-political stability enjoyed by Malaysia (except for the racial riots of 1969) can be viewed as one of the favourable factors conducive to industrial development. Maintaining such a stability was possible for Malaysia partly due to the increasing presence of *bumiputeras* in economic activities, an outcome of almost two decades of the NEP. The long-term commitment to continuing its national policies, despite changes in leadership, has been another contributing factor. The extensive natural resource base of the country has given an added advantage for industrial development. Malaysia remained the world's major exporter of rubber, tin and palm oil and also has become a significant exporter of tropical timber, petroleum and natural gas by the time it began its industrialization process. The income received through these exports served as a good foundation for spearheading rapid industrial development (Fong 1989).

6.2.3 Decision Making Process

As noted above, systematic efforts towards policy formulation and implementation for promoting industries were evident in Malaysia only after the introduction of NEP and the First Outline Perspective Plan (OPP1) in 1971. These efforts were further strengthened by the subsequently introduced IMP in 1986 and the NDP in 1991, along with successive Five Year Development Plans. In this endeavour the Ministry of International Trade and Industry (MITI) and the Ministry of Finance (MOF) played a quite significant role, whilst the Federal Industrial Development Authority, formed in 1965, was supportive in the process of coordinating the industrial policies.

Despite continuous government efforts and a long-term commitment to industrial development, carrying out the decision making processes effectively has become a difficult task for Malaysia, for several reasons. Firstly, policy makers in ethnically-divided Malaysia was not fortunate enough to enjoy an autonomy in decision making like in Korea which is ethnically homogeneous. The unequal wealth distribution between ethnic groups has been a major concern for Malaysia for a long period of time. These socio-political circumstances led Malaysian policy makers to place priority on achieving social objectives – especially the redistribution of wealth and economic activities from non Malays to the Malay community – over and above

the economic efficiency. For example, firms seeking state support, either in the form of tax relief or protection from imports, had to undertake to employ at least 30 per cent of Malays at all levels. Secondly, the process of efficient and effective decision making was hindered by the lack of an integrated approach between institutions, and the lack of clear administrative guidance, in particular in terms of the performance standards required of firms in return for the benefits and support received from the state.

6.2.4 Industrial Structure

State Owned Enterprises (SOEs) dominate the industrial structure in Malaysia, specially in the initial stage of industrialization process. The state has actively participated in the production process, through the creation of new public corporations and the extension of the range of operations of existing ones. In particular, they were prominent until the mid 1980s in production activities like food processing, agro based, timber based and building material industries. To boost *bumiputera* participation in commercial and industrial activities, and especially to employ and train *bumiputera* for executive and management positions, concerted efforts have been made by the state, either through holding equity shares in the new joint ventures in trust for the *bumiputeras*, initiating joint ventures with the private sector or buying up viable private companies and transferring them to private *bumiputera* ownership[4] (Fong 1989). Direct state involvement in manufacturing activities became even more widespread with the launching of the heavy industry program in the early 1980s.

Due to the lack of initiatives from the domestic private sector, and also for the purpose of boosting *bumiputera* participation, such state participation was deemed to be required for Malaysia. But due to the lack of experience many of the SOEs, except for a few such as Petronas and the National Petroleum Company, have not been able to show financial returns at a satisfactory level. This, coupled with the deteriorating macroeconomic situation in the mid 1980s, induced the government to gradually

[4] These activities are largely carried out by the various SOEs including Perbadanan Nasional (Pernas) Urban Development Authority, State Economic Development Corporations and MARA (Majlis Amanah Rakyat or the Council of Trust for the People).

introduce privatization, listing some SOEs on the stock exchange and restructuring the SOEs, while keeping some strategic industrial sectors such as automobile manufacturing under state ownership. With a comprehensive and broad ranging privatization programmes and other incentives, for example the Privatization Master Plan in 1991, the abolition of the development tax, the reduction in the corporation tax and so forth, the private sector has tended to play a more leading role since the early 1990s (Lall 1996; Islam and Chowdhury 1997; Brown 1993; Lim and Nesadurai 1997).

Realising the importance of private sector participation in decision making activities, the government initiated several steps such as introducing the concept of Malaysia Incorporated, setting up the Capital Issues Committee and the Foreign Investment Committee in the Economic Planning Unit, and the Malaysian Business Council (MBC) in the early 1990s. The primary objective of these activities was to stimulate private-public participation through: (a) coordinating local and foreign investments; (b) advising the private sector on participation in new ventures; (c) coordinating the industrial development strategies to achieve the objective of the NEP in increasing *bumiputera* participation in corporate activities; and (d) identifying and removing many of the unnecessary bureaucratic red tape hindering investments (Fong 1989; Lall 1996; Lim and Nesadurai 1997).

6.3 Diversity of Policies over the Period of 1960-1997

Malaysia started its industrialisation process by following import substitution industrialization policies (ISI). The first phase of ISI (roughly between 1957-1970) was continued for a longer period than in Korea.[5] Most of the industries established during this phase were either of the assembly or packaging type and were dominated by local Chinese-owned firms. They were relatively capital intensive, mainly due to the incentives given under the *Pioneer Industries Ordinance* of 1958,[6] which granted

[5] According to Anuwar (1992) there are three major phases: import substitution (1958-68); export orientation (1968- 80); and export led growth with second round import substitution (1980- to date).
[6] This legislation authorized the Minister of Commerce and Industry to grant "pioneer status" to a company that convinced him that the domestic industry was not now of a scale sufficient to meet the requirements for continued development in Malaysia, the prospects were favourable for the further

pioneer status to manufacturing industries provided that those industries fulfilled certain conditions.

In effect, while broadening the industrial base, the ISI helped to diversify the economy, to reduce excessive dependence on imported consumer goods, to utilise some domestic natural resources and to create employment opportunities. In particular, the ISI was successful in the resource-based industries such as tobacco, furniture, rubber products, wood products, and food and beverages (Salleh 1994). However, the ISI policies continued with minor reference to encouraging manufacturing exports. Over time, the scope for import substitution became more limited and it was difficult to find new opportunities for expansion mainly due to the relatively small domestic market.

These circumstances made Malaysia reconsider its industrial development strategies. As a result, Malaysia gradually shifted its emphasis towards export oriented industrialization (EOI) – largely based upon labour intensive industries in the 1970s. Of these, the electronics assembly and electrical equipment, and the textiles/garments industries played a significant role. For the promotion of EOI, pioneer status and tax reliefs, which had been granted previously, were further extended provided that industries satisfied a certain fixed percentage of *bumiputera* equity ownership. The establishment of Free Trade Zones (FTZs) and State Economic Development Corporations – funded by the federal government – and the provision of generous incentives have added further stimulus in promoting EOI (see Table 6.2 for details).

The EOI phase, begun in 1970s, has been continued placing more emphasis on consumer durables, intermediate inputs and capital goods. As in Korea, protection was also continued for the industries that served the domestic market (Lall 1996). Until the introduction of the IMP in the mid 1980s, trade policies, especially the degree of protection, were not considered important as a tool of industrial promotion, since they were imposed for revenue collection purposes. However, efforts have been

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development of the industry, and that it was in the public interest to encourage the industry (Bruton et al. 1992, p. 260).

made, after the introduction of IMP, to design trade policies in line with the overall development strategy (Brown 1993).

In spite of the steady progress, the industrialization process began to experience a number of structural problems by the early 1980s. The continuous emphasis of the NEP resulted in inefficient SOEs and accumulation of bad debts – mainly from the *bumiputera* enterprises. The manufacturing sector remained relatively isolated from the rest of the economy, and was highly concentrated in a few activities such as the electronics and electrical machinery, textiles and garment industries. Industrial exports were largely supplied by the FTZs. In response to these concerns, the government attempted to stimulate a broader based phase of industrial development, by establishing heavy industries.

The heavy industries drive was mainly initiated for the purpose of accelerating the pace of industrialization, by deepening and broadening the country's industrial base. However, it created further problems in the economy. Owing to the huge investments in heavy industries, Malaysia's fiscal and external debt increased dramatically. For example, the debt service ratio (external) rose from 4 per cent to 27 per cent during the period between 1980-1985 (Agrawal et al., 1996, p. 4.36). This situation was further aggravated by a sharp fall in the international prices of Malaysia's major commodity exports (rubber and tin), resulting in a dramatic decline in export revenue. This fall was mainly due to the second oil crisis and the recession in the OECD economies. Several other factors such as the crash of the electronics industry due to global overcapacity, the appreciation of the ringgit and the rising unit cost of production further reinforced manufacturing and economic slowdown. A combination of these factors led to a negative GDP growth (-1.1 per cent) in 1985 for the first time since independence (Okamoto 1994).

The economy recovered by the late 1980s, largely as a result of private investment, particularly due to foreign direct investment (FDI) flows and an overall increase in competitiveness following ringgit depreciation. Several external factors, in fact, contributed to this investment boom. The appreciation of the yen and rising production costs in Japan, rising wages and the resulting reduced competitiveness of

firms, and the withdrawal of preferential status from the Asian NICs, encouraged foreign investors to shift some of their industries to Malaysia[7] (Lim and Nesadurai 1997; Rasiah and Anuwar 1995).

To continue this economic progress it was felt that further changes in development policies were required. To revitalize the economy, firstly, steps were taken to expand the domestic as well as foreign private sector participation, while reducing the direct role of the government in production activities. Under the *Promotion of Investments Act* in 1986, new incentive packages were introduced for this purpose. Within these new reforms, the state's direct role in the economy would be focused on a limited number of strategic activities such as investment in infrastructure – mainly in building super highways, industrial estates, industrial parks and upgrading airport and ports, promoting human capital development and encouraging technological progress. Secondly, measures were taken to liberalize trade, especially since 1994. Under this program, tariff duties on most of the food and consumer good items were reduced. Along with these changes, Malaysia has recorded a significant economic as well as industrial progress since the mid 1980s (Brown 1993; Islam and Chowdhury 1997; Okamoto 1994; Lim and Nesadurai 1997).

This satisfactory economic performance has somewhat slowed down in the latter part of 1997 due to the adverse effects from the currency crisis, which also affected several other countries in the region. A combination of both internal and external factors has been largely responsible for this situation. The successful economic performance and deliberate policies for attracting foreign capital inflows have contributed to the rapid growth of net capital inflows. Persistent current account deficits, and short-term borrowing together with certain external factors such as slowing down of demand for exports and losses of international competitiveness, have added further pressure worsening the situation. Along with the crisis, difficulties arose in managing the macroeconomic and exchange rate policy. A downturn in equity prices was also evident. To overcome these adverse effects the authorities

[7] The Plaza Accord of 1985 triggered the yen appreciation. The Generalized System of Preferences was withdrawn in February 1988.

Table 6.2 Incentives and Institutional Support for Promoting Industries in Malaysia, 1957-1997

1957-1970

Main Strategy – Import Substitution

- Pioneer Industries Ordinance (1958) – granted pioneer status to manufacturing industries
- *Incentives*: Exemption from income tax 2-5 years; tariff concessions; duty exemptions on imported capital equipment and machinery
- Malaysian Industrial Development Finance (1960) – provided finance
- Malaysian Stock Exchange (1964) – promoted capital market
- Federal Industrial Development Authority (1965) – promoted and monitored manufacturing growth
- *Investment Incentives Act* (1968) – extended pioneer status and tax relief for industries which possessed certain fixed percentage of *bumiputera* equity ownership; offered tax holidays for firms which had been granted pioneer status; those established in designated development areas and those who incorporated a specific amount of domestic inputs into their products

1971-1980

Main Strategy – Promotion of Light Export Industries/Import Substitution

- *Incentives:* Extended pioneer status and tax relief provided that firms satisfied *bumiputera* equity ownership requirements; expenses incurred in export promotion were allowed double deduction from tax; firms that exported more than 20 per cent of their products were offered accelerated depreciation allowance; export allowance of 5 per cent of the free on board (f.o.b) value of export sales
- New Economic Policies (1971)
- *Free Trade Zone Act* (1971) – empowered to designate industrial sites as Free Trade Zones
- *Incentives:*Tax concessions; land at below market rates; streamlined customs formalities; duty free import of raw materials and capital equipment; accelerated depreciation allowance; deduction of overseas promotion expenses from tax; projects that involved exporting were permitted 100 per cent foreign ownership
- Amendment of *Customs Act* of (1967) – set up Licensed Manufacturing Warehouses
- Kuala Lumpur Stock Exchange (1973) – promoted capital market
- *Industrial Coordination Act* (1975) – created a system of licenses for all new and existing firms (except those employing less than 25 full-time workers with capital less than $25000) required them to obtain approval from the MITI for technology agreements involving foreign capital

1981-1997

Main Strategy – Export Promotion/Import Substitution (heavy industries)

- *Incentives*: Expanded incentives to foreign investors allowing 100 per cent equity ownership if exporting 80 per cent of products; 79 per cent equity ownership if exporting between 51-79 per cent of products; exemption of income tax for high technology companies for five years (provided that they spend at least 1 per cent of gross sales for R&D expenditure on annual basis and the percentage of science and technical graduates to total work force were at least 7 per cent), tax exemption for five years for pioneer industries; investment tax allowance of 60 per cent; tax exemption for 10 years or investment tax allowance of 100 per cent for 5 years for projects with heavy capital investment and high technology which generated extensive linkages; double deduction for expenses incurred in promoting exports (supply of free samples abroad, export market research, preperation of tenders for supply of goods overseas, cost of maintaining sales offices overseas), research and development investment and training expenses; initiated an export credit refinancing scheme to provide finance for exporters at preferential rates of interest; an export allowance of 5 per cent based on the FOB value of export sales; double deduction of export credit insurance premiums to encourage exporters to penetrate into non-traditional markets; industrial building allowance, which allowed companies to obtain 10 per cent initial allowance, an annual allowance of 2 per cent for buildings used as warehouses, as bulk storage installations for storing goods for export, for purposes of approved research, and industrial training
- Heavy Industry Corporation of Malaysia (1981) – planed, invested and managed projects in the field of heavy industries

(continued)

- Standards and Industrial Research Institute of Malaysia (1984) – developed industrial linkages; introduced ISO 9000, quality certification programme of the International Organization for Standardization
- New Investment Fund (1985) – encouraged domestic private investment
- Industrial Master Plan (1986)
- *Promotion of Investment Act* (1986)
- Malaysian Institute for Microelectronics Systems (1986) – developed local capabilities in micro electronics
- Intensification of Research in Priority Areas Program (1986) – stimulated R&D in microelectronics, biotechnology, information and communications, and advanced materials
- National Science and Technology Policy (1986) – promoted technology
- Relaxed the ceilings of *Industrial Coordination Act* (ICA) and equity requirements (1985-86) – relaxed ICA requirements from shareholders funds of M$ 1 million or a full-time workforce in excess of 50 persons in 1985 to M$ 2.5 million or a full-time work force in excess of 75 persons; all new foreign investment between 1986-1990, were exempted from the *bumiputera* equity requirements
- Amended *Investment Incentives Act* of (1968 (1986) – offered incentives to FTZ firms to stimulate them to purchase their parts and components locally; developed the technical capability of local vendors
- Industrial Adjustment Fund (1987) – encouraged domestic private investment
- Promote SMEs (1989) – automatic pioneer status; an increase in reinvestment allowance from 40 to 50 per cent; full exemption of import duty and surtax on raw materials, components and machinery; double deduction on cost of training with the approved institutions
- Action Plan for Industrial Technology Development (1990) – improved R&D infrastructure
- Industrial Technical Assistance Fund (1990) – modernised and enhanced technical capacity of SMEs funds provided to carry out feasibility study, product development and design, quality and productivity, and market development
- Promoted subcontracting (1991-92) – introduced a 30 per cent local sourcing requirements, Anchor company Program – offered assistance companies involving electric/electronics activities
- Set up technology parks – promoted R&D
- Set up ceramic park – developed ceramic industry
- National Development Policies (1991) – promoted human resources and technology infrastructure
- Second Outline Perspective Plan (1991-2000) – emphasized National Development Policies while providing guidelines for industrial policies
- Malaysian Technology Development Corporation (1992) – commercialised research results of universities and research institutions and developed indigenous technology
- Malaysia Industry Government Group of High Technology – identified new markets, business and investment opportunities
- *Human Resource Development Act* (1993) – promoted human resources ; HRD Fund (firms employ 50 or more are required to contribute 1 per cent of their pay roll); for firms whose employment size between 10-49 were provided 200 per cent subsidy for approved expenses, introduced Integrated Action Plan for HRD
- Liberalization of Trade (1994) – tariff duties of food and consumer good items were reduced
- Capital Market Liberalization (1995) – raised efficiency and competitiveness of financial and capital markets
- Second Industrial Master Plan (1996) – stressed human resources, industrial deepening, targeting high tech and capital intensive products
- Kuala Lumpur Options and Financial Futures Exchange (1996) – improved financial activities

Sources: Fong (1989); Taylor and Ward (1994); Lim and Nesadurai (1997); Islam and Chowdhury (1997); Rasiah and Anuwar (1995); Rasiah (1995); Kanapathy (1994).

intervened in exchange rate market, opted to allow the ringgit to depreciate and announced an emergency economic package in early December 1997, including further expenditure cuts and a slowing down of infrastructure spending. Though, Malaysia appears to be lightly touched by this crisis than the other economies in the region, these developments are beyond the scope of present study.

6.4 Diverse Policy Instruments

The diversity of policies implemented in Malaysia, reviewed above, in turn implies that a variety of policy instruments have been applied in Malaysia for the purpose of overcoming market deficiencies. While the specific content of the policy packages used for industrial promotion was in many respects similar to that found in other countries, many of these instruments used were biased towards achieving country specific requirements such as boosting *bumiputera* participation. The extent, form and rationale for using these various instruments in the context of Malaysia will be discussed under two subheadings as import substitution related measures and export promotion and growth-related measures. It is important to note that organizing the measures adopted for industrial promotion under these two categories becomes difficult, due to the simultaneous application of these measures in Malaysia. Nevertheless, measures that have been taken towards fulfilling financial needs and promoting small and medium scale industries are discussed under the import substitution heading, since those measures have been largely directed towards stimulating *bumiputera* participation.

6.4.1 Import Substitution Related Measures

Fulfilling domestic market needs has been a major motive of promoting industries in Malaysia until 1970. Industries begun during the first phase of ISI have been largely promoted through the incentives given under the *Pioneer Industries Ordinance* of 1958,[8] which granted pioneer status to manufacturing industries provided that those

[8] "This legislation authorized the Minister of Commerce and Industry to grant " pioneer status" to a company that convinced him that the domestic industry was not now of a scale sufficient to meet the requirements for continued development in Malaysia, the prospects were favourable for the further

industries fulfilled certain conditions. Primarily it allowed exemption from income tax for a period of 2-5 years. The length of the tax holidays was dependent upon the amount of initial fixed capital expenditure. For example, projects which were over $250,000 were granted five-year tax holidays. The subsequently introduced *Investment Incentives Act* of 1968 further extended tax holidays to firms that had been granted pioneer status. Also under this *Act* establishments which did not qualify for pioneer status were granted tax credits. Additional incentives in the form of tax holidays were also granted to firms which were established in designated development areas and to those incorporating a specific amount of domestic inputs into their products (Fong 1989).

These generous incentives played a significant role in attracting FDI. Stimulated by incentives, most of the initial foreign investments to Malaysia were attracted for defensive reasons. This means that firms which had been exporting to Malaysia were interested in setting up firms for the purpose of protecting their market share. In particular, the foreign direct investment that was attracted in the area of tyres, pharmaceuticals, electronics, fertilisers and the chemical and petroleum industries largely came for this reason (Kanapathy 1984).

The measures applied by Malaysia for its initial ISI phase, however, were different from those of Korea in a number of respects. Firstly, Malaysia relied less on protective measures for promoting import substituting industries. As Bruton et al. (1992) and Okamoto (1994) noted, Malaysia has maintained a modest level of protection compared to countries at a similar level of development. Maintaining such a modest level of protection was possible for Malaysia because it enjoyed a strong and favourable balance of payments position. Secondly, in its initial phase of ISI, not much enthusiasm was evident for promoting products for export markets. Partly, lack of policy initiatives were responsible for this outcome since almost all import-substituting industries were bound by export restriction clauses in their initial stages (Kanaphathy 1984). The ethnic tensions that existed between the Malay government and the Chinese business sector may also have held back concerted efforts to promote

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development of the industry, and that it was in the public interest to encourage the industry" (Bruton et al. 1992, p. 260).

the local private sector in more complex activities (Lall 1996). In due course, the scope for import substitution became more limited and it was difficult to find new opportunities for expansion, mainly due to the relatively small domestic market.

Though the ISI policy continued afterwards, during the 1970s policy emphasis was more biased towards export oriented industrialization. However, ISI policies became prominent again in the early 1980s, with the emphasis on heavy industries and on certain strategic industries. This latter phase was somewhat different from the earlier phase of ISI because, contrary to former policies, policy makers placed more emphasis on encouraging industries to produce for both domestic and export markets.

(a) Measures for Promoting Heavy Industries and Industrial Targeting

Fears of increasing protectionism in Western markets, rising labour costs, lack of industrial linkages and integration experienced in the operation of both ISI and EOI strategies in previous periods, and the necessity of building up of her own industrial elites and industrial culture, led Malaysia to reconsider its prevailing industrial strategy. Consequently, Malaysia made steps to expand its industrial structure by initiating heavy industry policy in the 1980s. To carry out all the activities relating to the heavy industry drive, including planning and investment, the Heavy Industries Corporation of Malaysia (HICOM) was set up in 1981, under the direct supervision of the Prime Minister. Though some of the heavy industries were owned by foreign firms, the majority were under the control of the state, mainly due to the lack of response from the private sector since such projects involved high costs, and risks and long gestation periods (Lall 1996). As in Korea, most of these industries were capital intensive and emphasis was also placed on developing capital and producer goods.[9]

By initiating heavy industries the government aimed to achieve a number of objectives: (a) accelerating the pace of industrialisation, by deepening and broadening the country's industrial base; (b) redistributing national income; (c) increasing the utilisation of natural resources; (d) enhancing technological capability by

[9] Under the HICOM, cement, sponge iron, steel, pulp and paper and petrochemical industrial projects have been established.

collaborating with foreign firms and by investing in local R&D and (e) developing inter-industry linkages. It was expected that HICOM would primarily concentrate on upstream manufacturing activities, thus providing an industrial base while allowing the private sector to take an initiative in setting up downstream industries (Lall 1996).

HICOM mainly undertook two strategies in promoting heavy industries: joint ventures with foreign partners and protection. Due to the lack of industrial experience and as a way of enhancing technology, including production processes and product development, and of training local personnel at the managerial, engineering, supervisory and technical level, a series of joint ventures were initiated by HICOM. These involved with foreign partners such as Honda, Suzuki, Yamaha and Mitsubishi in a number of fields including iron and steel, cement, automobiles and small internal combustion engines. A number of energy refining and utilising projects, an ammonia-urea fertiliser project and production facilities for the processing of natural gas were also initiated under the heavy industries policy (Bowie 1994).

Protective measures were used as another key policy instrument for promoting heavy industries. In general, though Malaysia had maintained a relatively low level of protection previously, the degree of protection was raised significantly for these industries. For example the government imposed a total ban on the import of steel bars in 1984, the tariff on imported cement was raised up to 50 per cent of the imported value and the import duty on completely built motor vehicles was raised from 90 per cent to 100 per cent in 1984 (Anuwar 1989, p. 306). Apart from that, in order to produce at their maximum capacity, the government also provided export subsidies (for example for the Proton car project) to these industries (Okamoto 1994). Despite the measures adopted for stimulating exports, only the automobile industry showed significant progress in terms of exports.

Against this background, the IMP introduced significant changes in the industrial development process of Malaysia. The IMP, sought to encourage the private sector by indicating the strategic direction of industry policy and by inducing potential investors through administrative guidance and incentives. In addition, industrial planning was refocussed from a largely market-oriented approach to a

substantially target-oriented approach. As an initial step, the IMP emphasised 12 key industrial sub-sectors for industrial expansion, comprising seven resource based industries in which Malaysia enjoyed comparative advantage and five other non-resource based industries (see Table 6.3 for details). The IMP also identified a number of priority products and product groups for development and export promotion and rationalisation. Industries which interrelated with each other, and had linkages with other sectors of the national economy such as the agriculture, mining and service sectors, were considered as priority industries under this process. In particular, three categories were identified as potential products to be developed, namely: (a) those having potential comparative advantages and thus requiring further support from the government with respect to technology, manpower, new investment and infrastructure; (b) those considered essential for the national economy but currently suffering from inefficiency and non-competitiveness and thus requiring modernization and rationalization; and (c) those to be promoted as export oriented products (UNDP, 1985, p.26). This industrial targeting process was further extended with the introduction of Action Plan for Industrial Technology Development in 1990. Accordingly, six industries were identified as strategic industries for further development (Rasiah and Anuwar 1995; Brown 1993).

Table 6.3 Targeted/Strategic Industries in Malaysia

Period	Industries
Industrial Master Plan 1986	*Resource Based* Rubber Products, Palm Oil Products, Food Processing, Wood Based Industries, Chemicals and Petrochemical, Non Ferrous Metal, Non Metallic Mineral *Non-Resource Based* Electronics and Electrical Equipments, Transport Equipments, Machinery and Engineering Products, Ferrous Metal Products, Textiles and Apparel
Action Plan for Industrial Technology Development (APITD)1990	Information Technology, Electronics, Biotechnology, Advanced Manufacturing Technology, Advanced Materials Technology, Energy

Source: UNDP (1985); Rasiah and Anuwar (1995).

Except for specifying targeted industries in its planning process, and providing tax and financial incentives, the intensive strategies such as promoting competition among strategic industries, the use of administrative guidance and requiring strong performance standards that applied in Korea are hardly evident in Malaysia. Performance of heavy industries was not up to expectations. Many experienced huge losses. Mismanagement, lack of industrial experience and unfavourable world economic conditions were largely responsible for this outcome. To improve the situation, therefore, by the late 1980s, the government gradually abandoned the role of state management, while encouraging private, foreign and non-Malay participation. Measures were also taken in rationalising certain industries such as the motor vehicle (Proton), steel manufacturing and the palm oil industry, which suffered from excess capacity (Fong 1989).[10]

(b) Measures for Fulfilling Financial Needs

The Malaysian Industrial Development Finance (MIDF), the Bank *Bumiputera* and the Development Bank of Malaysia played an important role in providing finance. The former assisted through financing viable new industrial projects and the latter two through helping to mobilize rural savings and by supplying loans and capital to potential Malay entrepreneurs. In addition to that, to cover huge public investment in heavy industries, Malaysia relied heavily on external sources of finance, as did Korea. Despite the efforts of these institutions and the domination of the commercial banking sector by two state-owned companies, the domestic financial system played a relatively minor role in Malaysia compared to Korea. The subservient role of the domestic financial sector may perhaps be attributed to the relative importance of other financial avenues in the economy such as massive FDI flows, the development of the capital market, and the private sector's preference for financing their investment through retained earnings and equity (Agrawal et al. 1996; Brown 1993).

[10] IMP suggested that Proton should be given priority while rationalizing the other heavy industries. Under this program it was expected to provide support for producing a medium range passenger car for Proton and asking other assemblers to produce other range of vehicles thus limiting production to handful of producers each specialising on specific range.

Apart from the FDI flows, the next most important source of finance in Malaysia was the capital market. Since the 1960s Malaysia had paid special attention to promoting capital markets by forming the Malaysian Stock Exchange, initially with a trading floor in Singapore and, in 1964, with a trading floor in Kuala Lumpur (Brown 1993).[11] Until the early 1980s, the role of capital market was minor, due to the relatively erratic capital formation and excessive speculation. With continuous development of the regulatory framework, however, the Kuala Lumpur Stock Exchange (KLSE), had achieved international status as the world's thirteenth most highly capitalized market with a total capitalization close to US$ 200 billion by the early 1990s (Lim and Nesadurai 1997). Through a series of reforms, such as improving the trading system, creating a unified securities commission, and introducing legislation to establish a financial futures and options exchange, continuing attempts were made to improve the activities of the capital market. More importantly, to address the needs of SMEs, a second board was added to the KLSE in 1988. Particularly after the Sixth Five Year Development Plan (1991-95), financial policy aimed to increase the operations of the capital market, encompassing developments in the equity and debt markets and the futures and options exchanges. Financial activities were further strengthened by the launching of the Kuala Lumpur Options and Financial Futures Exchange (KLOFFE) in early 1996.

(c) Measures for Promoting Small and Medium Scale Enterprises

In seeking to accelerate the industrial path of Malaysia, the NDP recognized that it was essential to promote small and medium enterprises (SMEs) as a means of reducing the dependence on multinationals. The government's overall objective in promoting these enterprises was and still is to develop local entrepreneurship, to create productive employment, and to increase the productivity and incomes of small entrepreneurs. In particular, through these activities it was expected to increase Malay participation in the economy. For these purposes, food processing, wood based products, light engineering, plastics and ceramics were identified as potential sectors (Fong 1989; Islam and Chowdhury 1997).

[11] In 1973, the Exchange was split into the Kuala Lumpur Stock Exchange and the Stock Exchange of Singapore.

Promotion of the SMEs was considered to be necessary for promoting inter-industry linkages between exports and domestic sectors, to build a more integrated and sound industrial structure (Kanapathy 1994). In addition to the vendor, subcontracting and anchor programmes that will be discussed later, SMEs were encouraged through training, advisory and consultancy and financial services provided by various agencies.[12] To facilitate industrial support facilities and to integrate SMEs with large scale enterprises, steps were undertaken in the context of overall industrial estate planning through the location of SMEs within the existing industrial estates (Fong 1989). Financing, another important tool in promoting SMEs, has also been made available to these industries under preferential terms and conditions. In this respect, for example, the Credit Guarantee Corporation, initiated in 1975, encouraged commercial banks to provide more loans to SMEs, in addition to its primary task of providing guaranteed cover for credit facilities made available by commercial banks for financing their capital requirements. To modernise and enhance the technological capability of SMEs, another major step was made in 1990, by establishing the Industrial Technical Assistance Fund (ITAF). Under this initiative, four programmes were introduced, to provide support for feasibility studies, product development and design, productivity and market development. Grants provided under this scheme met the 50 per cent of the costs for these activities. However, priority was given to SMEs that were promoted under the *Promotion of Investment Act* of 1986 (Kassim 1995). Further, SMEs were allowed to have tax free holidays and investment tax credits while encouraging them to participate in exports and industrial fairs (Rasiah and Anuwar 1995).

In spite of these efforts, the SME sector plays a relatively minor role in the economy by the early 1990. A bias in incentives towards greater capital intensity and the overwhelming attention paid to equity and *bumiputera* participation have been partly responsible for the lack of progress in the SME sector. To overcome some of these weaknesses, the original incentive system was reoriented to remove capital

[12] Several agencies such, the Rural Industry Development Authority (later renamed as the Council of Trust for Indigenous People or MARA), the NPC, and the Ministry of National and Rural Development, played a significant role for providing services to SMEs.

biases by amending the *Investment Incentives Act* of 1968. Accordingly a tax free holiday was made independent of the quantum of investment, the nature of the product and the location of the firm. And the export level became the major determinant of the duration of the tax free holiday. Along with these changes, tax incentives, including the investment tax credit and the accelerated depreciation allowances initiated with the 1989 Budget, were further extended to SMEs. Further, in government procurement SMEs were given preferential treatment (Kanapathy 1994). Providing these generous incentives, though Malaysia was able to attract a small number of domestic firms into new industries such as telecommunication, the overall contribution of these firms in terms of exports, technology and R&D still remains at low level.

6.4.2 Export Promotion and Growth Related Measures

Realising some of the limitations of its initial ISI phase, Malaysia has made considerable efforts towards promoting export oriented industries since the early 1970s. Starting with light manufacturing industries, Malaysia has gradually entered into the production of high value-added and technology intensive products. With a view to promoting exports, Malaysia offered generous incentives, encouraged foreign direct investment through establishing FTZs and extended assistance through various institutional mechanisms. To maintain sustainable industrial and economic growth, further attempts such as promoting technology, R&D, human resources and industrial structure have also been made.

(a) Measures for Promoting Foreign Direct Investment

It is believed that foreign direct investment (FDI), by providing capital resources to finance investment activities, transferring technological know-how and helping to penetrate overseas markets, plays an important role in developing countries. In addition to these common benefits, FDI was encouraged in Malaysia for two other basic reasons. First, Malaysian policy makers thought that FDI would lead to the establishment of large-scale firms. Secondly, given their favourable historical experience of FDI, in particular the contributions made by the British through trading

and financial companies to the continuity to the economy, policy makers were optimistic about the role of foreign investment in Malaysia. Coupled with these reasons, the fact that there was less participation of Malays than of Chinese in manufacturing activities made the promotion of FDI appealing for political and economic reasons (Bruton et al. 1992).

To maximize these benefits, Malaysia like other developing countries, encouraged FDI from the outset of its industrialization process. Two factors, (a) liberal policies and (b) generous incentive packages and privileges, facilitated through the establishment of FTZs, industrial estates and Licensed Manufacturing Warehouses (LMWs), largely influenced the flow of FDI into the economy of Malaysia.

Malaysia largely encouraged FDI through liberal policies until the early 1970s. After the NEP in 1971, however, a certain rules in relation to foreign equity ownership was stressed for industrial projects that were substantially dependent on the domestic market and for projects involving the extraction and primary processing of non-renewable domestic resources. Nevertheless, projects that involved manufacturing for export market were permitted to have 100 per cent foreign ownership.

The ownership restructuring process continued further with government sponsored takeovers of foreign companies and also with the enactment of the *Industrial Co-ordination Act* (ICA) of 1975. This *Act* required manufacturers to obtain operating licenses and made the issuing of licenses dependent on the firm meeting ownership quotas. Accordingly, all new and existing firms (except those employing less than 25 full-time workers and with capital less than $25000) were required to obtain approval from MITI for technology agreements involving foreign capital (Brown 1993). Relaxing some of these requirements by the mid 1980s, however, the government actively supported foreign participation as the principle vehicle for rapidly expanding capital and technology intensive industries. To provide a further boost to FDI, a variety of measures were introduced. These mainly included: (a) introducing laws to limit the ability of national labour unions to press for higher wages and improved employee working conditions; (b) relaxing domestic equity

requirements, and rules containing the employment of expatriate employees (Bowie 1994).

These measures were further complemented by the *Promotion of Investment Act* of 1986. This *Act* expanded the incentives available to foreign investors, and in particular it allowed more flexibility on the part of authorities to approve higher foreign equity participation (Lall 1996). For example, under the *Promotion of Investment Act* of 1986, foreign investors were allowed to hold up to 100 per cent equity in a firm if the latter exported 80 per cent or more of its production. Foreign equity ownership up to 79 per cent was allowed if the firm's exports were between 51 per cent and 79 per cent, depending on factors such as the level of technology, spin off effects, size of the investment, location, value-added and the utilisation of locally produced raw materials and components (Anuwar 1992). Later, these incentives were further expanded allowing foreign investors to hold up to 100 per cent equity provided they exported 50 per cent or more of their production, employed 350 full-time Malaysian workers consistent with the racial composition of the country, and did not directly compete with domestic products. Tax rates on corporate profits were lowered and tariffs were reduced on business equipment.

Realising that the ICA remained as one of the obstacles hindering new investment and the expansion of existing enterprises, in 1985 the government relaxed the ceiling for ICA coverage to firms with shareholder funds of $1 million or a full-time workforce in excess of 50 persons. This ceiling was further raised to $2.5 million or a full-time workforce in excess of 75 persons in 1986. At the same time, the government took some steps in relaxing its stance on redistribution. Accordingly, in 1986, the government announced that all new foreign investment between 1986 and 1990 would be exempt from the *bumiputera* equity requirements (Fong 1989).

In addition to liberalisation policies, the major factors in attracting FDI have been largely seen as the establishment of FTZs, industrial estates and LMWs.[13] With

[13] Through the amendments made in the *Customs Act* of 1967, export oriented firms located outside FTZs were recognized as LMWs thus facilitating those firms to apply for the same privileges enjoyed by the FTZ firms.

the initiation of the *Free Trade Zone Act* in 1971, a number of FTZs – the first, the Bayan Lepas Free Trade Zone, and two others, Prai and Prai Wharf – were set up under the Penang Development Corporation to further facilitate FDI in 1972. Following those as models, another eight FTZs were established and another six sites were proposed as FTZs in other parts of the country. The *FTZ Act* of 1971, empowered to designate industrial sites as FTZ, and provided essential infrastructure and customs clearance facilities. Firms located in a FTZ could import all their import requirements (raw materials and components) duty free and export their products without customs formalities. To obtain those privileges firms were, however, required to export at least 80 per cent of their products (Fong 1989; Lim and Nesadurai 1997). Through the setting up of a growth triangle with Singapore and Indonesia, attempts were also made to attract new investments into Johor. Another growth triangle was planned with Thailand and the Sumatra province of Indonesia, to promote outward labour intensive activities from Penang (Lall 1996).

In general, FTZs have been seen as successful in enhancing output, export promotion and employment creation. Nevertheless, owing to certain inherited weaknesses, their presence generated less than expected results for industrial development. The majority of FTZ firms were involved in electronics and electrical components, and textile manufacturing, and a significant portion of manufacturing export income of Malaysia was derived through these two sectors. Electronics exports, for instance, account for over one-half of the country's manufactured exports produced in the FTZs by the early 1990. Despite these contributions, FTZs appears to be economic enclaves without substantial economic linkages with the rest of the economy. Moreover, preferential treatments in the form of incentives provided to FTZs distorted factor prices and contributed to a dualistic industrial structure. Firms in the FTZs could import their needed components duty free and did not have to pay any taxes on their exports. This process encouraged firms to use imported components, resulting in the continued absence of linkages with the economy, and firms could remain in the FTZ without making further investments outside the FTZ. To overcome some of the problems noted above, amendments introduced in the *Investment Incentives Act* of 1986, proposed specific incentives to FTZ firms to purchase their parts and components locally (Fong 1989, p. 210).

(b) Measures for Promoting Technology Development

Initial step towards promoting technology in Malaysia was evident with the establishment of Technology Transfer Unit (TTU) for the purpose of screening technology transfer agreements, following the implementation of the *Industrial Coordination Act* of 1975. Under this *Act*, all manufacturing firms which signed technology transfer agreements with foreign companies were required to get approval from the TTU. In this process, the TTU ensured that the agreement will (i) accord with national interests, (ii) impose fair and justifiable restrictions on the Malaysian party and (iii) the payments of fees, wherever applicable will be commensurate with the level of technology to be transferred and will not have adverse effects on Malaysia's balance of payments. In addition, with the view of maximising potential benefits, the TTU has laid down a number of guidelines regarding purchase of components and intermediate inputs; insisted that all technical fees or royalty payments be based on net sales (after deducting discount or returns, transport costs, insurance, duties, taxes and any other charges from gross sales) and intervened in demanding that consent for sales outside the restricted territories should not be unreasonably withheld.

Except the measures initiated by the TTU, until the mid 1980s, generating employment opportunities and enhancing entrepreneur skills were the major motives for attracting FDI. Realising the importance of technology development however, with the launching of the Fifth Malaysia Plan (1986-90) and the Industrial master Plan (1986-95) in early 1986, Malaysia started to pay greater attention to the development of industrial technology and to initiate policy guidelines for the national development of science and technology. Policy emphasis on technology development further continued with the Second Outline Perspective Plan (1991-2000). This plan has stressed the importance of making science and technology as an integral component of socio economic planning and development which entails building competence in strategic and knowledge based technologies, and promoting a science and technology culture in the process of building a modern economy.

While continuing political commitment and increasing public awareness on technology development Malaysia intensified technology screening process further with the introduction of an Action Plan for Industrial Technology Development (APITD), in 1990. In this process, MITI played a significant role with the support of the Malaysian External Trade Development Corporation and the Malaysian Industrial Development Authority (MIDA). When approving technology transfer agreements, MITI is particularly concerned with the level of technology, local equity participation, local content, export share of output, patents, trademarks, investment level, R&D facilities, human resource training, removal of restrictions on sales market, the continuing use of technology after the license expires, and the possibility of transferring improvements of technology involved to licensor. Little efforts however are yet evident on monitoring or ex post appraisal of technology transfer agreements The lack of experience and expertise who are capable to assess the technology content that is imparted to domestic licensees moreover hindered the effective operation of technology screening process (Rasiah and Anuwar 1995; Hadi 1994; Anuwar 1992).

As far as technology transfers in Malaysia are concerned, technology transfer agreements (TTAs) between subsidiaries in Malaysia and parents firms abroad, have become a main source. As Rasiah and Anuwar (1995) noted, studies show that FDI has contributed positively in terms of formal and informal technology transfer, improving efficiency[14] and human capital deepening, especially in the electric/electronics (semiconductor), machine tools, plastic, tyres, telecommunication components and the textiles and garment industries. Attempts were also made to promote technology transfer, through the promotion of subcontracting relationships and through the anchor company program.[15] To stimulate subcontracting, financial incentives were subjected to the fulfilment of a 30 per cent local sourcing condition in 1991. Moreover, the government encouraged firms to acquire part or all of foreign firms in strategic technology areas. Accordingly, South Korea's Heavy Industry

[14] The techniques such as total quality management (TQM), total productive maintenance (TPM) Just in Time (JIT) quality control circles (QCCs) statistical process control and integrated materials resource planning (MRPII), which developed with Japanese investments are widely used as efficiency building tools in Malaysia.

[15] Under the anchor company scheme mainly electric/electronics firms(Sapura and Sharp Roxy, . Matsushita Electric, Sony electronics, Hitachi Electronic Products, JVC Electronics and Philip//JVC Video) received assistance from the MITI beginning with 1992 (Rasiah and Anuwar 1995, p. 5).

Corporation ventured into building ships for the foreign market, and the Malaysian Technology Development Corporation (MTDC) entered a joint venture with Hambrecht and Quinst to access the latter's network of high technology industries (Rasiah and Anuwar 1995, pp. 10-11).

In addition to technology screening, more selective policies have been adopted in relation to export oriented foreign firms. For example, by using incentives MIDA encouraged FDI into higher value-added, more technology intensive activities. To strengthen technology development further, the government made steps to expand from relatively low tech industrial estates and FTZs to highly specialised industrial parks with much higher value-added and high tech industries. By 1995, there are five such highly specialized industrial parks in Malaysia (Lim and Nesadurai 1997).

The Malaysian Industrial Development Authority (MIDA) was responsible for implementing policies to attract foreign investment. It operated a number of branches in various international capitals, functioning as an adviser to MITI on the formulation of industrial policies, undertaking economic feasibility studies of industrial possibilities and promotional work, and facilitating exchange of information and coordination among institutions involved in industrial development. It also assisted private investors in identifying viable industries, organising investment seminars and investment missions abroad, and acts as an intermediary for local private investors and foreign investors. In one observer's view, MIDA's concerted efforts enabled Malaysia to attract more electronics firms and also to enter the high-tech export path quickly (Lall 1993).

(c) Measures for Promoting R&D

Recognising the critical need for R&D, since late 1980s, the IMP and the successive development plans (Fifth, Sixth and Seventh) have made considerable efforts to improve the public sector R&D infrastructure. This emphasis was further intensified with the APITD introduced in 1990. On the whole, these initiatives stressed the importance of increasing R&D funds allocated to R&D institutions, the commercialization of research results, and the interaction between private firms and

public R&D institutes. Emphasis on industrial deepening stressed further with the introduction of the Second IMP in 1996. As outlined in this plan, it was expected to target high tech, capital intensive, labour saving processes, advanced information technology products and to deepen of Malaysia's industrial structure into manufacture of end products (Lim and Nesadurai 1997; Brown 1993; Rasiah and Anuwar 1995; Lall 1996).

This policy emphasis was primarily supported through the establishment of a variety of state agencies. Their activities, in general, ranged from providing financial, advisory and consultancy services to specialised research and development facilities. Among others, the Standards and Industrial Research Institute of Malaysia (SIRIM), the Malaysian Institute for Microelectronics Systems (MIMOS), the Malaysian Technology Development Corporation (MTDC), the Malaysia Industry Government Group of High Technology (MIGHT), the National Productivity Corporation (NPC), have been playing a significant role in these activities.[16]

Besides these institutional supports, several other measures have been taken to stimulate R&D. One such measure was the introduction of the Intensification of Research in Priority Areas (IRPA) Programme in 1986. Along with this programme, a number of new technology areas, such as microelectronics, biotechnology, information and communications and advanced materials, considered as critical to the economy. Other important measures included the establishment of technological parks in Bukit Jalil and Johor, the high technology park in Kulim to promote commercialisation and application of technology through nurturing of entrepreneurs, and the Chemor Ceramic Park to enhance the development of the ceramic industry. Like other countries, R&D was further promoted through the provision of generous incentives. For example, under the *Promotion of Investment Act* 1986, firms which were categorised as high technology companies were given full tax exemption of statutory income for five years, provided that they had an expenditure of at least 1 per cent of gross sales for local R&D expenditure on annual basis and the percentage of

[16] Moreover, the institutions such as the Rubber Research Institute, the Malaysian Rubber Products Research Organization, the Malaysian Agricultural Research Institute, the Forest Research Institute, and the Palm Oil Research Institute carry out research and development activities.

science and technical graduates to total work force of at least 7 per cent (Brown 1993; Rasiah and Anuwar 1995).

Despite these attempts, in terms of R&D Malaysia has so far made a little progress. Heavy reliance on FDI and imported technology, lack of early policy initiatives to promote indigenous technology and lack of private sector initiatives towards R&D, may partly be responsible for the slow progress. In addition, the amount spent on R&D in Malaysia is still small with compared to other countries in Asia. As Lim and Nesadurai (1997, p. 203) noted, total expenditure on R&D spending remains less than 1 per cent of GDP in 1995. This rate of R&D spending is less than half the rate in South Korea and Taiwan. Moreover, most of the funds allocated for industrial research remained under-utilized. As Lim and Nesadurai (1997, p. 206) noted, according to the 1993 review of IRPA projects, "industrial research was allocated only 28 per cent of IRPA funding compared to 47 per cent for agricultural R&D. Moreover, only 46 per cent of the industrial research funds were actually used compared to a 90 per cent utilisation rate of the agricultural R&D allocation."

(d) Measures for Promoting Human Resources

With continuous economic growth, Malaysia confronted another critical problem, labour shortages in the skilled, technical and professional categories.[17] Recognizing these shortcomings, Malaysia attempted to address them, especially after the mid 1980s. As part of their attempt, the *Human Resource Development (HRD) Act* introduced in 1993 replaced the Double Deduction Training Incentive for firms employing 50 or more. This *Act* required firms employing 50 or more to contribute 1 per cent of their payroll to the HRD Fund, which was administered by the HRD Council. Under this program firms were able to claim approved expenses relating to human resource development. To promote human resources amongst SMEs, the HRD Fund was further extended to firms with an employment size of 10-49 persons, and with a subsidy of 200 per cent for every approved expense incurred. Several other

[17] According to Lim and Nesadurai (1997, p. 195-203) Malaysia now has full employment, with labour demand outstripping supply by almost 2 to 1, and have an average of 8.4 researchers per firm.

measures such as announcing an Integrated Action Plan for human resource development, introducing liberal policies to permit industries to recruit foreign semi-skilled, skilled and professional personnel and encouraging skilled and professional Malaysians working overseas to return back to Malaysia were introduced with the view of overcoming skilled labour shortages. (Lim and Nesadurai 1997; Rasiah and Anuwar 1995; Brown 1993).

6.5 Conclusion

Malaysia was primarily dependent on primary production sector, centred on the mines and plantations, until it began systematic efforts towards promoting manufacturing industries with the introduction of the New Economic Policies in 1971. Well endowed with natural resources, but with little industrial base inherited from colonial rule, it has made remarkable economic and industrial progress over the past three decades.

An examination of the nature and incidence of industrial policies of Malaysia reveals that they differ from that of many comparable countries on a number of accounts. Firstly, differences with other countries both in policy measures and their application, are notable in Malaysia, due to its overwhelming emphasis on achieving social equity and also due to its heavy reliance on foreign direct investment.

Secondly, due to certain country-specific factors, such as the vast array of natural resources, the ethnic composition, the lack of autonomy in decision making, and the lack of private sector (Malay) participation, several other differences in policy application are evident in Malaysia with compared to the comparable countries.

Thirdly, many of the essential ingredients that may be required for effective policy implementation, such as performance standards, continuous follow up procedures, an emphasis on efficiency and directed measures to maximize potential benefits from specific initiatives, were absent in Malaysia.

7. Diversity and Incidence of Industrial Policies in Thailand, 1960-1997

7.1 Introduction

Thailand encompasses a large geographical area, well endowed with natural resources. It is centrally located in South East Asia with a population of 59.4 million in 1995, thus potentially offering a large domestic market. Like other developing countries, it has been a predominantly agricultural country until it made concerted efforts towards industrialization with the introduction of its Third Economic and Social Development Plan in 1972.

As with Korea and Malaysia, during the last three decades Thailand has achieved remarkable economic as well as industrial growth and has also emerged as one of the fastest growing economies in the world. As can be seen from the Table 7.1 (column 2), Thailand has managed to increase its real GNP per capita almost fourfold during the period 1970-1995 and has achieved an average annual GDP growth rate of more than 6 per cent during that period.

The manufacturing sector of Thailand has also shown remarkable results, both in terms of value-added and exports. As the figures in Table 7.1 (column 5 and 6) demonstrate, manufacturing sector value-added as a percentage of GDP increased from nearly 13 per cent to 28 per cent while the relative contribution of the agricultural sector has decreased from 36 per cent to 12 per cent over the period 1960-1995. Similarly impressive results are evident with regards to exports. According to the data shown in Table 7.1 (column 7), manufacturing sector exports accounted for only 2 per cent of merchandise exports in 1965. By 1975, their contribution had increased to 14 per cent. Subsequently, manufacturing sector exports grew at an increasing rate and have become a leading sector in the economy of Thailand, contributing 73 per cent of merchandise exports by 1995.

Table 7.1 Economic Indicators of Thailand, 1960-1995

Year	GNP per Capita	GDP (% growth)*	Manufacturing Value-Added (% growth)*	Manufacturing Value-Added (% GDP)	Agriculture Value-Added (% GDP)	Manufacturing Exports (% Merch. Exp)	Manufacturing Exports (% growth)*
1960	-	-	-	12.5	36.4	-	-
1965	-	-	-	14.2	31.9	2.0	-
1970	493	6.9	9.5	15.9	25.9	4.7	5.0
1975	567	4.7	8.1	18.7	26.9	14.7	2.7
1980	715	5.9	6.7	21.5	23.2	25.2	8.3
1985	840	4.2	3.6	21.9	15.8	38.1	6.2
1990	1275	9.2	13.0	27.2	12.7	63.1	16.0
1995	1777	6.8	8.7	28.5	10.8	73.1	11.0

Notes: - Data is not available.
* Five Year Average (data are in constant $US, 1987 prices).

Source: World Tables, World Bank, ANU.

The published literature attributes this overall success to a variety of both internal and external factors. Though there is no uniform view most commentators, (such as Warr 1993, 1995; Warr and Nidhiprabha 1996; Winwan 1994; Poapongsakorn and Fuller 1997; Poapongsakorn 1995) have attributed this recent economic and industrial success to internal factors, in particular to the prudent state economic policies. Among others it is believed that economic policies such as sound macroeconomic policies, in particular conservative financial and fiscal policies, trade and industrial policies have been largely influential for this remarkable economic success, which made Thailand part of the East Asian miracle. It has also been claimed (Falkus 1995; UNIDO 1992; Suphachalasai 1995; Sen 1996) that certain other external factors such as favourable trends in world markets for Thai manufactured products, American spending during the Vietnam War, the impact of Japanese economic growth and growth of the other NICs – providing export markets and foreign capital investment – have also contributed.

Like the previous Chapters 5 and 6, the main objective of this chapter is to examine the incidence of industrial policies in Thailand over the period 1960-1997. This chapter is organized as follows. Section 7.2, explores diverse country-specific factors, including the objectives of industrial policies in Thailand, historical factors, the decision making process, and the relative roles of the state and of market

mechanisms. The diversity of policies implemented over the period of 1960-1997 is examined in Section 7.3. The policy instruments applied in Thailand for promoting industries are again discussed under two broad categories, namely import substitution related measures, and export promotion and growth related measures in Section 7.4.

7.2 Diverse Country-Specific Factors

7.2.1 Objectives of Industrial Policies

The industrial policy objectives of Thailand appear to be less explicit and less ambitious than those of other comparable countries in Asia. Thailand did not have a specific industrial plan like Malaysia nor did it follow intensive industry specific intervention policies like Korea. Rather industrialization in Thailand came about through policies that formed part of the Economic and Social Development Plans implemented since the early 1960s.

Both the First (1961-66) and the Second (1967-71) Economic and Social Development Plans, while proclaiming import substitution as the major industrial strategy, placed emphasis on the utilization of domestic raw materials and on the promotion of labour intensive industries in addition to achieving overall economic growth (Poapongsakorn and Fuller 1997). This policy stance continued until the late 1960s, and the industrialization process was largely encouraged through private sector participation.

Recognizing the constraints of import substitution and realising positive results of export led growth in countries like Japan and Korea, however, Thailand also began to shift its emphasis towards export led growth. As a result, beginning with the Third Economic and Social Development Plan (1972-76), Thailand placed priority on export promotion. This plan also paid attention to setting up specific priorities for reducing the growing disparities between urban and rural areas and between sectors.

The subsequent Economic and Social Development Plans, continued their emphasis on export development, but also focused on several other objectives. For

instance, in addition to promoting large scale exporting firms and trading companies, the Fourth (1977-81) and the Fifth (1982-86) Economic and Social Development Plans (1982-86) were formulated for the purpose of achieving the development and conservation of economic resources and environment, diversification and increasing efficiency of production in rural areas, the development of principal cities and the improvement of Bangkok, and the dispersion of basic and social services.

Placing priority on export promotion and spatial balance, the Sixth Economic and Social Development Plan (1987-91) emphasised improving the administrative structure and stimulating the private sector role in the economy. Recognizing the long felt need for industrial upgrading, the Seventh (1992-96) Economic and Social Development Plan stressed the importance of industrial deepening, which it proposed to achieve by developing basic industries, promoting environmentally friendly industries and the diversification of markets. Overall these latter plans placed more emphasis on the quality of growth rather than the rate of growth (UNIDO 1992; Suphachalasai 1995; Warr and Nidhiprabha 1996; Islam and Chowdhury 1997).

Summing up, promoting import substitution industries was a major objective of Thailand's industrial policy until the early 1970s. Thereafter, export promotion became the main thrust. This latter objective, coupled with the dispersion of manufacturing industries to provincial areas, has been given prime importance in the economic policies of Thailand during the past two decades. Industrial upgrading, which is considered to be necessary for sustained growth in the industrial sector, has only come into the policy agenda in the early 1990s.

7.2.2 Historical Factors

Thailand had been fortunate enough to be an independent country without foreign invasion. Historical factors have played a relatively minor role in its industrial development in Thailand compared with Korea and Malaysia. Available evidence suggests that Thailand benefited considerably from American aid and military expenditure throughout much of the 1950s, 1960s and early 1970s. More importantly,

the American military presence during the Vietnam War led to a significant improvement in Thailand's infrastructure (Falkus 1995).

7.2.3 Decision Making Process

The decision making process of Thailand has a number of distinguishing features and differs from that of other countries in a number of respects. Firstly, the governing structure of Thailand is a constitutional monarchy with an elected parliament. Thailand's political history is dominated by the authoritarian military governments, with brief periods of democracy, and this has led to some instability. Nevertheless, this political instability has not become a major threat to the economic activities. The close connection between the military and Thai politics appears to have had some influential effects on the economy. The Thai political system is organized in such a way that political leaders have had to be acceptable to the military. Hence most of the political leaders either are or have recently been senior military service men. The military implicitly has exercised a certain amount of control over economic activities. The strong military connections in part prevent wide ideological differences in economic matters. In particular, all major parties agree that it is vital to preserve Thai traditions and institutions and especially to remain loyal to the monarch (Warr and Nidhiprabha 1996, pp. 3-7).

Secondly, economic decision making is carried out under the guidance of four major agencies: the National Economic and Social Development Board (NESDB), which is mainly responsible for planning public investment projects and for preparing the five year Economic and Social Development Plans; the Ministry of Finance, which deals with the revenue; the Bureau of the Budget (BOB), which is in charge of the expenditure side of the Budget; and the Bank of Thailand, which decides on the appropriate methods for public sector borrowing. These four institutions contribute to industrial promotion in various ways. For example the NESDB identifies industries that should be promoted, while the Fiscal Policy Office of the Ministry of Finance operates a comprehensive tax refund system called tax rebates, for all taxes incurred in the production of goods subsequently exported.

In addition to these four agencies, several other agencies are involved in the decision making process. The Board of Investment (BOI) plays a dominant role in determining promotional measures. The Ministry of Industry controls the establishment and expansion of factories and production plants and the use of local contents in production. The Industrial Estate Authority of Thailand (IEAT), established in 1972 controlled by the Ministry of Industry, develops and manages industrial estates (IEs), providing investors with necessary services and utilities at a lower cost.[1]

Although all these institutions contribute to the overall development of the industrial sector and the economy, lack of coordination and inconsistent views between various agencies have hindered effective policy implementation in Thailand. For instance, the Economic and Social Development Plan, which is prepared by the NESDB, called for government support of small scale industries. In contrast, the BOI, which had the power to ignore the objectives of the national plans, favoured large scale capital intensive industries (Poapongsakorn and Fuller 1997; Warr and Nidhiprabha 1996).

Thirdly, Thailand's decision making process is somewhat more biased towards conservative economic policies than other comparable Asian countries. In particular, policy makers have been interested in maintaining a balance of trade and the value of the baht. Thailand was successful in maintaining a stable exchange rate for a long period of time. This was partly possible due to the control of domestic inflation and the sound level of international reserves. These conservative policies, in particular in relation to the exchange rate, appear to have not only provided incentive for export expansion but also helped to attract direct foreign investment. In this process, Thai policy makers adhered to similar basic political and economic philosophies. That means achieving economic growth has become a major motive. Further they all shared the belief that market forces combined with prudent public sector infrastructure investment should be the principal means for achieving economic growth.

[1] In the mid 1990s, the IEAT is managing twenty-one industrial estates (Poapongsakorn and Fuller 1997, p. 158).

Poapongsakorn (1995) holds that, preference towards conservative economic policies partly could be attributed to the policy attitudes of senior bureaucrats. Partly, the World Bank recommendations appear to be influential in maintaining such policies.

7.2.4 Industrial Structure

Compared with other comparable countries such as Korea and Malaysia, the Thai government plays a limited role in industrial activities. The ideological values of Thai politicians, as well as of the policy makers, are partly responsible for the limited government role. Contrary to the prevailing practices in some other East Asian countries, they took the view that government should provide a supportive role within the framework of a free market economy. Historically, the government's role was limited to maintaining social order and financial stability. Thus the role of the public sector was confined largely to tax collection, provision of a limited range of public services and the commercial operation of public enterprises. However, export pessimism – in the wake of collapse of the Korean war boom, falling prices of primary commodities, and a fear of over dependence on a narrow range of primary product exports – led to expanded state involvement in economic activities in the early 1950s (Falkus 1995, p. 22). Along with the introduction of the *Industrial Promotion Act* in 1954, therefore, the government's role in industrial activities began to expand. Under this *Act* a number of state enterprises were initiated in Thailand. The majority of the products produced by these enterprises were based on the simple processing of local foodstuffs and primary products. These products were protected through tariffs and geared primarily to the domestic market.

Due to a change in political leadership and macroeconomic difficulties, by the 1980s the government gradually intensified its role in economic affairs. State-owned entities were created to exploit the country's natural resources, provide public utilities, create basic infrastructural facilities and undertake manufacturing ventures that were considered important for the rapid transformation of the country. Nevertheless, public sector direct participation in production ventures remained only in limited activities, such as the production of soda ash, zinc smelting, petrochemical industries, natural gas, paper manufacture and sugar milling (Warr and Nidhiprabha 1996, pp. 67-68).

This limited public sector participation on the one hand reflected Thailand's ideological preferences – a free market economy. On the other hand it implied the high relative significance of the private sector. Since the inception of its industrialization process, the private sector, both domestic and foreign, has played a dominant role in Thailand. Since late 1950s, following the recommendation of the World Bank, private sector participation was encouraged in Thailand. With its privatization program, which began in mid 1980s, the role of the private sector expanded more rapidly. In addition, the Seventh Economic and Social Development Plan emphasized the need for reducing role of government as the principal economic stimulator, by limiting public expenditure and encouraging private investment (Islam and Chowdhury 1997; Winwan 1994).

The private sector enjoys great freedom in their business activities. Unlike Indonesia and Malaysia, there are no deliberate attempts to promote indigenous people in Thailand. Irrespective of the nationality, therefore, business people, which include the dominant Thai majority and the rest of the ethnic groups, enjoy greater freedom in their business activities than in Malaysia. The cottage and small scale industries are mostly Thai-owned and are dominant in sectors such as gems and jewellery, garments, auto parts and food processing. Technologically more sophisticated industries, and basic industries, are controlled by the medium and large scale firms, the majority are foreign owned. There are also signs of developing vertically integrated large business groups, mainly Sino-Thai firms, which are supported by the top commercial banks.

As regards to the private sector, two developments are noteworthy. Firstly, the private sector in Thailand is more organized, in terms of industry associations and similar bodies, than in other comparable countries such as Malaysia and Indonesia. For example, a number of business associations have been formed, namely the Thai Chamber of Commerce, the Association of Thai Industries and the Thai Bankers Association. These associations further enabled the formation of the so-called Private Consultative Committee (PCC), with membership from all these associations and a rotating chairmanship (Dhiratayakinant 1995, p. 106). These organizations facilitate negotiations and discussions of the problems and requirements of the private sector, with government officials. Since the mid 1980s, these organizations have often been

consulted by ministry officials and macroeconomic technocrats for decision making purposes.

Secondly, there has been evidence of increasing coordination between the private sector and public sector than over the past two decades. Despite several attempts to formalize an active public-private partnership, prior to the 1980s the private sector had never been prominent in Thai public decision making. With the formation of the Joint Public-Private Consultative Committee (JPPCC) in 1981, however, there were signs of increasing cooperation between the private and public sectors. The establishment of this committee (JPPCC) indicated the government's determination both to seek advice and cooperation from the private sector in solving national economic problems and to assist the development of the private sector. Since its inception this committee has focused primarily on: (1) reviewing and improving laws and regulations that obstruct private entrepreneurial activities; (2) policy formulation; (3) information collection and dissemination; (4) developing agriculture and the agro industry and (5) developing a provincial partnership (Dhiratayakinant 1995, pp. 106-110).

7.3 Diversity of Policies over the Period 1960-1997

During the 1950s Thailand did not have a pressing need to develop the manufacturing sector because of the strength of the agricultural sector, a sound balance of payments position and satisfactory employment growth. Realising the danger of depending on a limited range of primary products vulnerable to frequent price fluctuations, however, by the 1960s, like other countries, Thailand started its industrialisation process by initiating import substitution policies. The main objective of following these policies was to reduce Thailand's dependence on imports of foreign goods, thereby saving foreign exchange and raising income levels through increased domestic value-added. During the 1960s, industries that were based on the country's natural resources, which mainly included food processing (e.g. rice milling), were particularly encouraged (Poapongsakorn and Fuller 1997, p. 148).

Protection was widely used as a main tool in stimulating industries. The majority of the industries protected during the 1960s were capital intensive and large industries (Suphachalasai 1995). The protective system has been biased against the agro-based industries and towards the manufacturing sector in both import competing and non-import competing. Among the manufacturing assembly industries, motor vehicles have largely been promoted by providing a large tariff differential along with tax concessions. It is also reported that protection given to final products was relatively high compared to inputs and capital goods and thus discouraging the production of inputs and capital goods (Wawn 1982; UNIDO 1992; Warr 1993).

During this early import substitution period, economic growth was impressive, thanks to both favourable internal and external factors. In particular, favourable world demand for Thai products and US military spending in the country did much to provide such impressive economic achievements (Warr and Nidhiprabha 1996, p. 71). However, by the latter half of the 1960s Thai policy makers realised that the potential for their import substitution policies was reaching its limit. At the same time Thailand was experiencing balance of payments problems, mainly due to the stagnation of exports (Urata and Yokota 1994).

To cope with these problems, it was recognized that policy changes were necessary and the Third Economic and Social Development Plan (1972-76) called for the fostering of labour intensive industries through the promotion of exports. As a result, since the mid 1970s, Thailand's economic planners and their academic advisers have shared an interest in promoting exports. With the enactment of the *Investment Promotion Act* in 1972, attention gradually shifted away from import substitution towards export promotion. This shift of interest, though arising mainly from slow progress and the unfavourable effects of import substituting industries, was also required to address the macro economic problems faced by Thailand at that time. In addition, the remarkable economic progress of Japan and other NICs, perceived to be achieved through export led growth, had influential effects on changing the policy stance in Thailand (Falkus 1995). Despite this policy change, the government maintained the import substitution policy in the area of consumer durables and intermediate goods.

The industrial policies specified in the Third Economic and Social development Plan set priorities for the types of exports to be promoted, namely the products of industries using domestic raw materials and labour intensive processes located in regions outside the Bangkok (Dhiratayakinant 1995, p. 101). As in the period of import substitution, export promoting policies favoured large scale industries and agro-based industries such as rice milling, frozen sea food and canned fruit, which use agricultural products as raw materials. Along with the modification of the *Investment Promotion Act* of 1972, which extended tax incentives to promote investment, trading companies were also promoted (Warr and Nidhiprabha 1996, p. 79). With this revised *Act*, import tax was removed from imported inputs used in export activities, and business tax was lifted from exported products (Kraiyudht 1995, p. 104). There was a growing emphasis on developing labour intensive export oriented industries, such as garments, rubber products, wood products, jewellery and footwear. In particular, by the mid 1980s, there was a dramatic increase in the production of electronic products. Rice cookers, television parts, electronic condensers, electric fans were produced, largely for the export market. Efforts were also made to increase value-added, by producing more complex products such as facsimiles, cellular telephones, cordless telephones and satellite receivers (Winwan 1994, p. 63).

Export oriented industries were encouraged by providing various incentives, such as: tax privileges and refunds; tax exemptions on imported raw materials, components or re-exported items; electricity cost reductions; marketing assistance, such as by organizing international trade exhibitions, and trade missions and by establishing commercial and trade offices abroad; streamlining customs procedures and abolishing unnecessary regulations; establishing export processing zones and bonded warehouses; and a drawback system on customs duties (for more details on these incentives see Tables 7.2 and 7.4). The generous incentives further included: guarantees against nationalization, price control and competition from new state enterprises; temporary import surcharges and bans against competitive imports; and additional incentives for exports and for investment in special zones outside Bangkok. Promoted firms were also entitled to request additional protection in the form of import surcharges. In addition to these measures, the Bank of Thailand provided

credit assistance either in the form of concessional interest rates, by discounting loans to manufacturers, or by export promissory notes (Falkus 1995, p. 23; Urata and Yokota 1994, p. 446).

Though the policy emphasis was shifted towards export promotion, tariff protection continued. Fairly high tariff protection, averaging around 30 per cent, continued until the early 1980s (Suphachalasai 1995, p. 67). Though attempts have been made to reduce import tariffs on raw materials, intermediate products and capital machinery from time to time since the early 1980s, due to the ongoing fiscal and balance of payments deficits those attempts have not been successful up to the mid 1990s (Dhiratayakinant 1995).

With the initiation of the Fourth Economic and Social Development Plan (1977-81), several further policy changes were evident in the economy of Thailand. Most importantly, Thailand began its second import substitution period, with the formulation of the large scale industrial development programme (Eastern Seaboard Industrial Development Programme).[2] The discovery of natural gas led to the proposed developments in industrial sectors, particularly heavy industries like steel, gas, oil processing and petrochemicals. By introducing this industrialization program it was also expected to achieve regional development.

Since Thailand has been heavily dependent on oil imports, the first and second oil price increases severely affected the economy by the late 1970s. At the same time Thailand also suffered from a number of other macroeconomic problems, such as low levels of foreign exchange reserves, increasing external debt and a budget deficit. To overcome these problems, from 1981 onwards, several major economic changes were introduced: foreign borrowing was brought under control; the exchange rate was devalued; export taxes and import surcharges were reduced; and the fiscal deficit was

[2] This program involves a large scale planned investment that covered three provinces along the eastern coast of Thailand. In Chon Buri Province, the Laem Chabang area was the designated location for light and export oriented industries. The Rayong area was to house heavy industries mainly the petrochemical complex at Mab Ta Put. Further inland is the Chachoengsao area, which was to site various agro-based industries (Dhiratayakinant 1995, p. 105).

Table 7.2 Incentives and Institutional Support for Promoting Industries in Thailand, 1960-1997

1960-1970
Main Strategy – Import Substitution
• Promoted large and capital incentive industries using large tariff differentials, tax concessions and quantitative restrictions • *New Investment Promotion Act* (1960) – set up Board of Investment (BOI); select industries for promotion and issue Investment Promotion certificates • Industrial Finance Corporation of Thailand (1960) – provide long term project finance, and support industries by holding shares • National Applied Science and Research Institute (1963) – engaged in R&D in applied science to promote and utilize natural resources
1971-1980
Main Strategy – Promotion of Light Export Industries/Import Substitution
• *Incentives*: Finance at concessionary rates by discounting loans or by export promissory notes; import surcharges/tax rebate; permission to double the cost of transportation, electricity and water supply for deduction from taxable corporate income, and permission to deduct from the taxable corporate income up to 35 per cent of the investment costs of installing infrastructure facilities for 10 years from the date of income earning (see Table 7.3 for FDI incentives) • Local content requirement (1971) – imposed local content requirement for assembling motor vehicles - local content requirement has increased from 6.6 per cent for passenger vehicles and 11-15 per cent for commercial vehicles to 25 per cent for both • Industrial Estate Authority (1972) – develop and manage industrial estates • Rationalization (1971-78) – imposed limits on vehicle type, models, and engine size; imposed a partial ban on completely built-up vehicle in 1978 • Changes in foreign direct investment – emphasised on majority Thai ownership; Introduction of *Alien Business Law* and *Alien Occupation Law* • Revision of *Investment Promotion Act* (1977) – extended tax incentives and promote trading companies • Ministry of Science and Technology and Energy 1979 – promote science and technology
1981- 1997
Main Strategy – Export Promotion /Import Substitution
• Reduced protection; promoted small scale/high value-added industries; extended drawback system • Formation of Joint Public Private Consultative Committee (1981) – to build up cooperation between public and private sector • Tariff reforms/ liberalization attempts – planned to reduce the number of tariff rates from 60 to 5 per cent by 1997 which included 0-5 per cent for raw materials in short supply, 5 per cent for other raw materials, 10 per cent for intermediate products and 20 per cent for finished products, liberalized foreign exchange transactions in 1990, allowed banks to offer foreign exchange account if foreign transactions not exceeding $ 50000; delegated power to licence factories to provincial authorities • Direct foreign investment – ownership requirements eased depending on the extent of exports - firms export more than 50 per cent of its output can have majority of foreign share, firms export all of its output are allowed 100 per cent foreign ownership • Local content requirement – local content requirement increased up to 35 per cent for both passenger cars and commercial vehicles by the 1980s and later in 1990s increased to 54 per cent for passenger vehicles and 80 per cent for commercial vehicles

Source: UNIDO (1992); Suphachalasai (1995); Dhiratayakinant (1995); Winwan (1994); Christensen et al. (1993); Doner (1991); Sripaipan (1995).

transformed into a surplus (Poapongsakorn and Fuller 1997, p. 150). Tariff rates were rationalized with the objective of reducing the sectoral variation in effective rates, by lowering nominal rates to a maximum of 60 per cent (Islam and Chowdhury 1997, p. 261). These changes were primarily aimed at reducing the bias against export and heavy industries, improving efficiency and the operation of the market mechanism, and thereby strengthening competitiveness in the domestic as well as the world market. Along with these changes, the depreciation of the real effective exchange rate and the international relocation of light manufacturing industries during the 1980s resulted in an export boom in Thailand.

Reducing sectoral variations in tariffs was, however, not as successful as expected, due to the heavy dependence on tariffs as part of total revenue. In the early 1980s the revenues from these tariffs accounted for 20 per cent of the government's total revenue (Urata and Yokota 1994, p. 447). Faced with this situation, the government raised import tax rates on machinery and other products in 1985, while strengthening export promotion measures by providing further incentives. However, in the early 1990s a number of drastic measures were initiated, to further liberalize the economy, and improve the market mechanism and also to promote industries. For instance, as part of the liberalization policy, complying with Article 8 of the International Monetary Fund of May 1990, the second phase of liberalization of foreign exchange came into effect in April 1991. At the same time Thailand made an offer to GATT to reduce import duties on 1700 additional items. For example, as of October 1990, the tariff rate for production machinery was reduced from 20-40 per cent to 5 per cent (Sripaipan 1995, p. 149). Changes made, during the 1990s to improve the market mechanism suggest that Thailand is aware of the importance of improving competitiveness, to face the challenges arising from both developed as well as developing countries.

7.4 Diverse Policy Instruments

The previous discussion makes it clear that until the late 1960s import substitution policies dominated in Thailand. Afterwards, the Thai government alternatively applied, and even sometimes simultaneously applied, both import substitution and

export promotion policies, but overall placed more emphasis on the latter. As noted earlier, protective policies were applied mainly to encourage import substituting industries whereas generous incentives were employed to stimulate export promoting industries. It is often difficult to find the boundaries between the instruments applied for promoting import substitution and for export promotion. Nevertheless, as in the previous two chapters, instruments applied for industrial promotion in Thailand will be discussed under those two broad categories, as import substitution related measures and export promotion and growth related measures.

7.4.1 Import Substitution Related Measures

(a) Measures for Promoting Industrial Targeting

Though certain industry specific intervention strategies were adopted prior to the 1990s, they were neither intensive nor well coordinated and planned. In particular, Thailand did not follow an ambitious program for developing heavy and chemical industries like that of Korea. Instead, successive Economic and Social Development Plans, beginning with the Second Economic and Social Development Plan, specified that certain industries require to be promoted. Taking these plans as a broad framework the Board of Investment (BOI) prepared a list of industries eligible for promotional privileges.

The BOI, established in 1960 under the *New Investment Promotion Act*, played an active role in Thailand's industrialization process, particularly in activities relating to industrial promotion. Its main activities included identifying industries for promotion, issuing promotional certificates and negotiating incentive packages known as "promotional investment privileges". The BOI is chaired by the Prime Minister and involves several ministers, and therefore it has considerable authority. Although initially its activities were subject to cabinet approval, the introduction of the *Promotion of Industrial Investment Act* of 1977 allowed it more flexibility and independence in carrying out its activities (Poapongsakorn and Fuller 1997). Expanding its activities further during the early 1990s, the BOI sent missions abroad to attract investors to specific target areas of investment. There is evidence that in the

early 1990s the BOI began paying attention to supporting projects which gave priority to the transfer of technology and to developing the core industries benefiting related industries (Winwan 1994). BOI has also extended its services, from being an incentive granting agency to being a service oriented adviser, providing technical expertise on investment related issues.

The criteria used for selecting industries for promotional privileges are not made explicit and appear to be subjected to change from time to time. As noted earlier, development plans provide broad guidelines that are helpful in selecting industries for promotion. For instance, the Second Economic and Social Development Plan stressed the importance of promoting industries with growth potential. Industries identified for promotion under this plan thus included paper, chemical fertilizer, iron and steel, automobile assembly, cement, and textiles (Dhiratayakinant 1995, p. 101). Though the subsequent development plans specified certain industries for promotion, industrial targeting was given less priority in the policy agenda of Thailand until the early 1990s.

Table 7.3 Targeted/Strategic Industries in Thailand

Period	Industries*
The Seventh Economic and Social Development Plan (1992-96)	Electronics, Metal Working and Machinery, Petrochemical and Plastic, Textile, Food, Gems and Jewellery, Iron and Steel

Note: * Within these industries certain products were identified for the purpose of technology upgrading (for further details see Table 7.5).

Source: Sripaipan (1995, pp.166-167).

More specific and explicit attempts towards industrial targeting became evident with the introduction of the Seventh Economic and Social Development Plan. For the first time, this plan targeted industries at sectoral level. The main economic criteria used for selection of industries included industry growth potential, competitiveness in international markets and linkage effects. Technology assessment criteria contained four factors, namely dynamism, versality, viability and accessibility. Together with these aspects, and with recognition of the social and environment

impact, seven industries (see Table 7.3) were selected as targeted industries under this plan (Sripaipan 1995, pp. 165-166).

Table 7.4 Incentives of the Thai Board of Investment

1. Guarantees
• Against nationalization
• Against competition of new state enterprises
• Against state monopolization of the sale of products similar to those produced by promoted person
• Against price controls
• Permission to export
• Against imports by government agencies or state enterprises with taxes exempted
2. Protection Measures (subject to justification and needs)
• Imposition of surcharge on foreign products at a rate not exceeding 50 per cent of the CIF value for a period not more than 1 year at a time.
• Import ban on competitive products
• Authority by the Chairman to order any assisting actions or tax relief measures for the benefit of promoted projects
3. Permissions
• To bring in foreign nationals to undertake investment feasibility studies
• To bring in foreign technicians and experts to work under promoted projects
• To own land for carrying out promoted activities
• To take or remit abroad foreign currency
4. Tax Incentives
• Exemption of business taxes on imported machinery
• 50 per cent import duty reduction on machinery which is subject to import duty greater than or equal to 10 per cent
• Reduction of import duties and business taxes up to 90 per cent on imported raw materials and components
• Exemption of corporate income taxes 3 to 8 years with permission to carry forward losses and deduct them as expenses for up to 5 years
• Exemption of up to 5 years on withholding tax on goodwill, royalties or fees remitted abroad.
• Exclusion from taxable income of dividends derived from promoted enterprises during the income tax holiday
5. Additional Incentives for Export Enterprises
• Exemption of import duties and business taxes on imported raw materials and components
• Exemption of import duties and business taxes on re-exported items
• Allowance to deduct from taxable corporate income the amount equivalent to 5 per cent of an increase in income derived from exports over the previous years, excluding costs of insurance and transportation.

Source: Thai Board of Investment as cited in Sen (1996, p. 146).

A promotional certificate was the main tool applied for stimulating these industries. In order to enjoy promotional privileges, prospective investors had to first apply for promotional certificates. Those eligible for promotional certificates received preferential treatment. Typically such treatments included generous tax incentives, tariff exemptions, a guarantee of government protection from nationalization and from

direct competition by state enterprises, and guarantees of rights of profit and of capital repatriation (see Table 7.4). The range of incentives differed between the industries, depending on priority rankings in the promotion policy.

Initially, industries were categorised into three groups and the extent of incentives depended on the categories to which an industry belonged. For example, those industries categorised as group A normally received the highest level of promotion and were fully exempted from import duties and from business and sales tax on raw materials for five years, whereas group B industries were exempted to the extent of 50 per cent, and group C industries were exempted to the extent of one third, of these duties and taxes.[3]

This promotional privileges system begun in the 1960s continued until the 1970s without much change except the merging of categories A and B. During this period almost all promotional certificates were awarded to the firms producing for the domestic market. By the 1980s, however, a few but significant changes were evident in this promotional system. Most importantly, the BOI gave priority to export projects, particularly to ones using local inputs. Projects which provided employment, were located outside the Bangkok and were in investment promotion zones, were also encouraged. At the same time separate categories were abolished. The projects that attracted the most generous incentives included: projects that generate significant employment opportunities; located outside Bangkok; support energy conservation and import substitution of energy; generate savings and foreign exchange earnings; and projects that are complementary to the development of basic industries (UNIDO 1992; Sen 1996).

The methods applied for industrial promotion in Thailand in general, and industrial targeting in particular, suffered from a number of weaknesses. Firstly, through its industrial promotion Thailand consistently attempted to achieve a variety

[3] Industries were categorised into three groups: Group A included capital intensive industries such as the chemicals, electrical appliance, automobile and shipbuilding industries. Group B included assembling industries such as transport equipment assembly, agricultural machinery assembly, electrical

of objectives, some of which were in conflict. This has been the case up to the Seventh Economic and Social Development Plan. For instance the Sixth Economic and Social Development Plan called for the promotion of export oriented and small scale industries, while focusing on achieving regional balance simultaneously. It also emphasized the promotion of agrobased industries and engineering industries (Poapongsakorn and Fuller 1997, p. 150).

Secondly, the absence of an integrated approach regarding industrial promotion hindered industrial progress. Due to the very nature of the decision making structure of Thailand, industrial activities are handled by a number of institutions. This makes it difficult to maintain a consistent approach. For instance, the NESDB specified the industries that they considered suitable for promotion. Under these specifications the BOI tried to promote industries mainly through promotional privileges. The latter however enjoying more powers, sometimes acted contrary to the NESDB plans. Thus, though the Economic and Social Development Plan specified the promotion of small scale industries, the BOI favoured large scale capital intensive industries (Poapongsakorn and Fuller 1997, p.149).

Thirdly, industrial promotion appeared to be less effective than it might have been because of certain administrative weaknesses. Among others, frequent changes of promotional criteria and the absence of consistent policies in granting promotional privileges, were particularly noteworthy (Warr and Nidhiprabha 1996, p. 80). Further, none of the implementing authorities developed performance criteria for measuring success against the stated policy objectives, and hence rarely evaluated in formal terms the performance of the firms that they promoted through these policies.

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appliance assembly. Group C included labour intensive and service industries such as food processing, clothing and textiles, hotels and international shipping (Suphachalasai 1995, p. 77).

7.4.2 Export Promotion and Growth Related Measures

(a) Measures for Promoting Foreign Direct Investment

Foreign direct investment has played a significant role in the industrialization process of Thailand.[4] From the outset of its industrialisation process, Thailand followed liberal policies towards foreign investment and foreign companies were welcome for all manufacturing activities. Particularly, the Thai government did not make any distinction between domestic and foreign investment when providing incentives. Incentives such as the exemption from import duties and business taxes on imported raw materials, components, and re-export items, and selective exemption from business taxes and export duties applied equally to Thai or foreign firms since the early 1970s (Sen 1996, p. 147). Further, foreign firms which received the BOI promotion were entitled to obtaining all facilities without any restrictions. In particular, firms located in industrial zones and export processing zones were allowed to own land, bring in expatriate staff together with their spouses and dependents, and were exempt from import duties, business taxes on machinery for processing goods and on factory construction materials[5] (UNIDO 1992, p. 70).

Nevertheless, and in spite of its general, laissez-faire approach to foreign capital, some limited restrictions were introduced in the 1970s. Due to the widespread nationalist sentiment, there were tighter investment controls after 1972. Two laws, namely the *Alien Business Law* and the *Alien Occupation Law* (1972), which emphasised Thai ownership came into force. The former specified certain business activities that could be undertaken only by firms with a majority of Thai ownership while the latter reserved certain occupations for Thai citizens mostly in services, handicrafts and agriculture (Suphachalasai 1995, p. 81).

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[4] For example, foreign direct investment increased from US$ 45 million in 1970 to US$ 2.5 billion by 1985. During 1970-75 foreign direct investment accounted for around 60 per cent of total capital inflow (Suphachalasai 1995, p. 78).

[5] Some restrictions however have been imposed regarding land ownership, and employing foreign expatriates. Foreigners were not allowed to own land in Thailand so they had to rely on long-term leases

As a cheap production site, Thailand appeared to be attractive to many foreign investors. Foreign investment in sectors like electrical appliances and parts, electronic and communications equipment and parts, toys and plastic products, motor vehicle components and parts and textiles, was attracted for this reason among others (UNIDO 1992, p. 67). Generous tax and tariff incentives, duty drawbacks and rebates, the streamlined application procedure and the professional manner in which the BOI interacted with potential investors – assisting potential investors both Thai and foreign to identify promising new projects and find partners for joint ventures – also encouraged foreign direct investment in Thailand. The establishment of bonded warehouses and export processing zones involving the provision of generous incentives have been further influential in attracting investment.[6] For instance, firms which engaged exclusively in manufacturing for exports were allowed to set up bonded warehouses and import duty free inputs for their export products. Firms located in EPZs were also provided with infrastructure support and foreign investors were given freedom to own land, bring in foreign experts and remit foreign exchange abroad (Sen 1996, pp.147-148).

There were no explicit measures promoting indigenous firms through foreign investment, except the requirement of the majority of local equity needed for obtaining BOI incentives. This implicit requirement encouraged joint ventures. During the 1960s and 1970s the BOI favoured import substituting projects and joint ventures with Thai nationals. By the 1980s export oriented projects were given priority and ownership requirements were also eased depending on the extent of exports. Thus, firms where more than 50 per cent of output was produced for exports were allowed to have a majority of foreign share and firms which exported all of their output were authorized to have 100 per cent foreign ownership (Christensen et al. 1993, p. 18).

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and there were some restrictions on the number of foreign technicians and managers who could work in Thailand (Christensen et al. 1993, p. 17).

[6] By 1989, there were eighty nine factories which has given bonded warehouse status and four export processing zones.

In its initial period of industrialization, the US was the most important source of foreign direct investment, mainly in the areas of mineral resources and manufacturing. Since the mid 1980s, Japanese investment has played a dominant role in the economy of Thailand.[7] Japanese investment went into areas where a Thai industrial base was almost absent, for example motor cars and electrical appliances, and where existing Thai industries required technical expertise, for example synthetic spinning and synthetic fibre production. Thus, Japanese direct investment in Thailand was largely concentrated in industries such as textiles, metals, electrical machinery and automobiles. Japanese investment appeared to have been effective in promoting coordination in industrial upgrading in some industries. For example, the Japanese International Cooperation Agency (JICA) has been the major supporter of the Metal Working and Machinery Industries Development Institute, which provided technical support for small and medium sized firms (Christensen et al. 1993, p. 25). Apart from, that Japanese investment has been contributing to the Thai economy in several other ways. It has promoted market linkages between Thai and Japanese firms, developed sub-contracting networks, promoted information flows (for example, cooperation clubs in the automobile industry, which facilitated sharing information among Japanese and Thai makers of components) and strengthened the resources and capabilities of Thai firms to boost their bargaining power with the bureaucracy.

Despite the continuous inflow of foreign direct investment to Thailand, the progress made in terms of the assimilation of technology appeared to be less satisfactory. The enclave nature of much foreign investment, such as in export processing zones, the preference of foreign investors' for buying foreign technology, and the lack of policy initiatives may have been partly responsible for the limited progress in technology development.

[7] The appreciation of yen since the Plaza Accord of 1985 and the resultant need to avoid rising labour costs in the home country, given the existence of a cheap and relatively efficient labour force in Thailand basically prompted the expansion of Japanese direct investment in Thailand.

(b) Measures for Promoting Technology

Except the regulations regarding local content requirements, the measures introduced towards promoting food processing, gem and jewellery industries and some erratic measures towards rationalization of assembly industries, little effort had been taken in Thailand up to the mid 1990s to promote indigenous technology and to encourage industrial deepening. At that time four industries namely, motor vehicle assembly, motor cycle production, electric wire and steel production were subjected to local content requirements. In the case of motor vehicles, assemblers were required to source 54 per cent of their requirement of passenger car parts and 80 per cent of pick up truck parts from domestic supplies by the late 1980s (UNIDO 1992, p. 136; Doner 1991, p. 46; Warr and Nidhiprabha 1996, p. 80).

Though the local content policy in assembly industries has been somewhat successful in achieving expected targets – as Doner (1991, p. 47) stated "Thai local content is acknowledged to be the highest in Southeast Asia" – this policy initiative has suffered from a number of weaknesses. Firstly, the local content policy allowed manufacturers to decide themselves which parts they would produce locally and therefore there was not much influence in raising domestic technological capabilities. Moreover, parts production involves substantial foreign exchange outlays since those industries largely depend on imports of raw materials and machinery (roughly 60 per cent for the early 1980s are included imported parts).

The other significant measure that has been adopted for industrial upgrading is rationalization. Like the local content requirement, this has largely been limited to motor assembly industries. There was no control regarding the entry of assembling auto firms into Thailand in its early period of industrialization. By doing so it was expected that the competition would force weak firms from the market. This policy stance led to an increasing number of inefficient firms. To improve the efficiency of these firms, by early 1970s, there was a growing concern about the rationalization of industries. As a result, the Ministry of Industries announced several steps to rationalize the auto industry, particularly imposing limits on vehicle types, models, engine sizes, minimum capacity and investment in 1971. This rationalization process,

however, did not long last. With changes in political power, limitations imposed on vehicle type, engine size and model were dropped in 1972. Later in 1978 the government again adopted certain measures with the objective of improving the quality of Thai assembling products, including: a partial ban on CBU (completely built-up vehicle) imports and tariff revisions; a gradual increase and change in the method for computing local content and a ban on new assembly plants and vehicle models. The evidence suggests that this rationalization process was somewhat successful in the case of the diesel engine project, since the BOI decided to allow no more than three manufacturers. The overall success of both local content requirements and the rationalization process was, however, hindered by the conflicts of interest between Thai auto assemblers and parts manufacturers (UNIDO 1992, p. 139; Doner 1991, p. 48, 199).[8]

In addition to the measures noted above, a wide variety of agencies were established to deal with the areas of science and technology. These mainly included: the establishment of the National Research Council in 1956, to encourage research and development and to systematically increase the scientific and technological capability of the country; the National Applied Science Research Institute in 1963, to take charge of implementing research in applied sciences and to promote and utilize natural resources; and the Ministry of Science Technology and Energy (MOSTE) in 1979, for setting national policy and for planning in science technology and energy.

The ability to sustaining economic growth in Thailand is widely seen to depend on the extent of improvement of technological status and human capital. Policy circles in Thailand have long been aware of their need to improve technological capabilities and since the early 1980s steps have been taken to improve both these aspects. Realising the importance of technology development, for the first time, the Fifth Economic and Social Development Plan (1982-86) of Thailand focused on improving the technological status of the economy. This plan emphasised two issues:

[8] Regarding new tax reforms, local auto assemblers argued that those reforms would discriminate against locally produced cars in favour of imported ones and therefore they have called for a revision of the new tax structure. Further they pointed out that high production cost in the case of the automobile

the use of science and technology to increase production efficiency and the modification or improvement of imported technology. To achieve these objectives, this plan stressed the need for promoting the collection of basic data essential to technological development and appropriate foreign technology transfer, for increasing the country's scientific and technological research and for developing capability and mobilizing manpower for scientific and technological development.

While maintaining similar objectives to those specified in the previous plan, the Sixth Economic and Social Development Plan of Thailand emphasized two other key issues: the necessity for developing cooperation between science and technology (S&T) units of all government agencies and the private sector; and establishing effective linkage between developers and users of S&T. To address these issues, this plan proposed: (1) to implement a S&T management system and infrastructure development; (2) to increase the efficiency of S&T activities; (3) to undertake S&T manpower development and (4) to increase the efficiency of production (Sripaipan 1995, p. 151).

Likewise, the Seventh Economic and Social Development Plan (1992-1996) set targets (see Table 7.5 for industries targeted for technology development) to expand the use of technology in industry. These targets included: increase productivity at a rate of 2.6 per cent per annum; increase the supply of science and technology manpower in categories such as engineers, scientists, agriculturists, technicians and researchers; and increase the R&D expenditure to 0.75 per cent of GNP by 1996.

To achieve those targets it was proposed to stimulate the private sector to utilize more technology by:

- creating a competitive atmosphere, providing fiscal incentives, disseminating technologies to industries, improving government regulations and supporting the development of specific technologies for the targeted industries;

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industry was largely due to the high local content and therefore they demanded a reduction in local content requirements instead of reduction in import taxes.

- increasing the efficiency of technology acquisition and transfer, by building up bargaining power, promoting the diffusion of imported technology, upgrading the technological capability of state enterprises and monitoring the technology transfer program of large projects;
- developing S&T manpower by accelerating the production of scientists, engineers, mathematicians and skilled labor in areas of high demand, building up the stock of university teachers and researchers, stressing the urgency for training and improving the working environment of academic staff;
- organizing the R&D system to support industrial development by concentrating R&D on the selection, adaptation and improvement of imported technology, reorienting public R&D institutes to solve the technical problems of industry, supporting research in education institutions to serve as S&T knowledge centres; and
- increasing the role of private sector R&D, through fiscal and financial incentives, domestic market development and intellectual property protection, and by developing R&D as a career for researchers (Sripaipan 1995, pp. 163-65).

Such proposed measures had an impact in promoting an awareness of the role of science and technology among the private sector and in policy circles. Continuing emphasis on technology development thus led to the development of a number of science and technology cooperation agreements with foreign countries. With assistance from the US, thus Thailand was able to establish a science and technology development project with total funds of US$ 49 million over a period of seven years. The introduction of the *Law for Development of Science and Technology* can be cited as another important step. Under this law the Science and Technology Development Board (STDB) was established, to administer a Science and Technology Development Fund, which obtained funds from the government and other sources, including international agencies. The law also established three national centers: the National Centre for Genetic Engineering and Biotechnology; the National Centre for Metals and Materials Technology (NCMMT) and the National Electronics and Computer Technology Centre (NECTEC). These were specialized research institutes with the role of carrying out research and development, both in-house and under contract from industry. These national centres emphasized three areas, namely biotechnology,

materials and electronics, which were designated as three targeted areas. In addition to these initiatives, low interest soft loans and fiscal incentives for R&D projects promoted by the BOI have been provided to stimulate the private sector. About 1200 scholarships for advanced degrees in science and technology in industrialized countries were granted for future researchers and university teachers. Moreover, realising certain weaknesses, especially the lack of cooperation between various R&D institutions, attempts have been made by the Ministry of Science Technology and Environment to foster university-research-industry linkages along the lines of a proposed science park concept (Sripaipan 1995, pp. 150-163; UNIDO 1992, p. 29).

Table 7.5 Key Technologies and Proposed Strategies under the Seventh (1992-96) Economic and Social Development Plan in Thailand

Key Technologies	Proposed Strategies
Electronics – computer aided technologies; software engineering; circuit design process; technology production management; and mechanical technology	Promotion of investments in high technology products manufacturing; promotion of needed supporting industries; promotion of product design and development of target products such as personal computers small PABX mobile telephone, facsimile and application-specific integrated circuits (ASIC)
Metal Working and Machinery – computer aided technologies; production management and metal working technologies such as casting, forging machining, heat treatment, electroplating and stamping	Promotion of investment in machine tools industry; promotion of metal working industries; promotion of mould and die industry development; and development of automotive parts such as engines, transmissions, steering systems, and suspension systems
Petrochemical and Plastic – compounding moulds for plastic products and production management technologies	Improving plastics properties from commodity plastics to intermediate and engineering plastics; and establishing a design centre to provide products, mould and die design.
Textiles – the efficient use of modern machinery; production management and textile chemical technology	Subcontracting of world famous brand name manufacturing; promotion of investment for dyeing industry; and promotion for switching to modern machinery
Food – sterilization; production management; packaging and waste management	Planting of fruits and vegetables to industry standard; the use of modern machinery and incentives for waste utilization technologies
Gems and Jewellery – a set of colour standards for gems; computer aided technologies and precious metal metallurgy	Establishing gem standards; R&D in precious metal alloying; and tariff rate reduction for R&D equipment
Iron and Steel – ladle technology; steel alloying	Increasing the efficiency of furnaces; and acquiring alloy steel casting technology

Source: Sripaipan (1995, pp. 166-167).

(c) Measures for Promoting Human Resources and R&D

Thailand largely relied on imported capital goods and foreign direct investment for its technology acquisition requirements. Though foreign direct investment contributed to the economy in the form of product management and process technology, the contribution was less significant with regard to design or product specific technology. The overall status of science and technology in Thailand, especially R&D and human capital generation, remained at a comparatively low level in comparison to other comparable Asian countries. On the one hand, the lower innovative capacity of Thai companies was indicated by the low level of expenditure on R&D. Thai companies only invested 0.1 per cent of their sales on R&D in the late 1980s which is well below the Asian NIEs (Sripaipan 1995, p. 159). The presence of multinational firms is another reason. Having their parent company situated abroad, where major innovative activities are undertaken, these firms do not feel the need to undertake development work locally. Apart from these factors, excess demand due to a high growth economy; government policies that limited the number of companies entering individual sectors; high import taxes on R&D equipment and precision instruments; taxes on royalties and license fees for foreign technology; and shortage of technical manpower have all been cited as factors that further discouraged R&D development (Sripaipan 1995, p. 159).

(d) Measures for Fulfilling Financial Needs

Control over the allocation of loan funds, which was considered to be a powerful tool in controlling industrial development in countries such as Korea, has been less significant in the economy of Thailand, perhaps due to the nature of its financial structure. Like many other developing countries, Thailand's financial market contains both organized and unorganized sectors. In the former, commercial banks play a dominant role. Contrary to the prevailing practices in other Asian countries, these commercial banks are controlled by the private sector. In the 1990s, sixteen local banks, owned by families of Chinese origin, and fourteen foreign banks were involved in financial activities in Thailand. Besides providing finance to industries, the banks also provide services in international trade and money transfers, loan guarantees,

syndicated loans for industries specified by the Bank of Thailand and direct joint investment in private business securities. Local banks appear to be more organized and, under the Thai Bankers Association, they exercise certain amount of control over the activities affecting the banking industry. For example, they collectively set the standard rates for service charges and loan rates. This type of activity has become possible partly due to the concentration of ownership and also to their ability to function as a cartel-like structure (Warr and Nidhiprabha 1996, p. 39).

However, the Bank of Thailand exercises a certain amount of control over the activities of banks, particularly through legislation to limit concentration and by setting ceilings on both deposit and lending rates. With the objective of providing finance for priority sectors at concessional rates, the Bank of Thailand also started rediscount facilities. This facility is operated through the commercial banks and has been available for short-term credit since the 1950s. Initially, though this rediscounted facility has largely been allocated to rice exports, it has later been extended to other agricultural and industrial activities (Sen 1996, p. 148). Apart from the commercial banks, the Industrial Finance Corporation of Thailand, established in 1960, also plays a significant role by providing long-term project finance for private industries and by holding shares in companies in order to strengthen the confidence of shareholders, particularly at the initial stage.

Although there are some regulations on domestic borrowing and lending rates, private foreign borrowing has been relatively free in Thailand. Commercial banks and large companies have used this foreign borrowing as a means of adjusting their liquidity positions.[9] However, this process has certain implications for Thailand's financial system. In particular, this feature makes local liquidity highly responsive to changes in foreign interest rates and exchange rates, thus often creating excess liquidity when the world interest rate declines. This occurs because local commercial

[9]"It seems that when the foreign interest rate was high or when there was speculation about a bhat devaluation, capital inflow tended to slow down. Capital outflows, while officially requiring Bank of Thailand approval occur through quasi legal channels such as transfer pricing. Domestic interest rates constrained by the ceilings set by the Bank of Thailand do not rise correspondingly. As a result, liquidity in the domestic money market is tight. The reverse is true when foreign interest rates are low or the baht is strong" (Warra and Nidhiprabha 1996, p. 42).

banks have a rather limited portfolio choice, since the country's capital market is not well developed and capital outflow in the form of investing in foreign assets is tightly regulated (Warra and Nidhiprabha 1996, p. 42). Relaxing this regulatory environment, several financial market reforms were introduced in the early 1990s. These reforms extended the capacity of commercial banks to engage in foreign exchange transactions without seeking prior approval from the Bank of Thailand, and liberalized capital account transactions (Islam and Chowdhury 1997). These reforms were among many factors relevant to the financial crisis in Thailand and other countries of East Asia in late 1997, but this topic is beyond the scope of this thesis.

(e) Measures for Promoting Regionalization of Industries

One of the most notable features of Thailand's industrial development is the high concentration of industries surrounding Bangkok. According to the available evidence in 1987, manufacturing establishments in Bangkok and surrounding provinces accounted for nearly 60 per cent of all manufacturing establishments in the whole kingdom (Poapongsakorn 1995, p. 116). To address this issue, a number of steps have been taken by successive governments in Thailand. For example, the BOI included certain regional policy elements in its incentive packages, particularly by providing special incentives for industries located outside the Bangkok area.

With the objective of reducing the concentration of industries in Bangkok and surrounding cities, and more generally for regional development, the BOI introduced different zones, announcing that firms located outside Bangkok would be given preferential privileges. Initially, in 1973, the BOI designated seventy-two districts in twenty-one provinces as investment promotion zones. Due to the difficulties in promoting such a large number of areas with limited resources, in 1978 the location scheme was altered to four zones and later in 1987 these promotional zones were further limited to three zones (Poapongsakorn and Fuller 1997, pp. 156-157).

The BOI promotion approach of 1987 divided the country's 73 provinces into three different investment promotion zones, Zone 1: Bangkok and its

Table 7.6 Spatial Aspects of Board of Investment Incentives and Privileges in Thailand, 1978-1993

1978-82
Special Incentives • Business Tax on Sales: 50 per cent reduction for 5 years for Zones 1 and 2 and IEs; 75 per cent for Zones 3 and 4 • Corporate Income Tax: 50 per cent reduction for 5 years; double deduction of transport costs for 8 years for Zones 1, 2 and IEs; 10 years for Zones 3 and 4; deduction of 10 per cent of cost of installing or building infrastructure facilities for Zones 1 and 2; 20 per cent for Zones 3 and 4
1983-1987
Corporate Income Tax Exemption • 3-5 years depending on level of investment or employment, extendible to 8 years for projects which: save or earn $US 500,000 net foreign exchange in first three years, an agro-based, used domestic supplies for 50 per cent of total production cost, and locate factories in IEs or outside Bangkok.
Tax Exemption Machinery and Equipment • Projects located in IEs, in Bangkok and Samut Prakarn; projects that export 80 per cent of output
Special Incentives • Corporate Income Tax: 50 per cent reduction for 5 years for Zones 1, 2, 3, 4 or IEs and outside Bangkok if invest 300 million baht, employ 200 persons, save or earn US$ 1 million net foreign exchange in the first 3 years, an agro-based, and export 50 per cent of output; double deduction of 10 per cent of the costs of installing or building infrastructure for Zones 1 and 2; 20 per cent for Zones 3 and 4
1985 (Projects in IEs)
Corporate Income Tax Exemption • Additional exemption for 3 more years for projects located in IEs in Zones 1, 2, 3 and 4
Tax Exemption Machinery and Equipment • Tax exemption for projects located in IEs, in Bangkok and Samut Prakarn regardless of exports
Special Incentives • Business Tax on Sales: 90 per cent reduction for first 3 years and 75 per cent for following 2 years for projects in IEs, in Chiang Mai and Lampbun for proposals submitted before 12/31/1988 • *Corporate Income Tax:* 50 per cent reduction for 5 years for projects located in IEs, in Zones 1, 2, 3, and 4
1987-1988
Corporate Income Tax Exemption • Zone 1: exemption of 3 years for projects satisfying 2 or more of following: export less than 80 per cent, earn foreign exchange, employ 200 people • Zone 2: 3 year exemption extendible up to 5 years for projects which earn foreign exchange, an agro based, use domestic supplies for at least 60 per cent of inputs, employ 200 persons, locate in IEs • Zone 3: for target activities 4 year exemption extendible up to 8 years; for projects which earn foreign exchange, an agro based, use domestic supplies for at least 50 per cent of inputs, employ 200 persons, located in IEs.
Tax Exemption Machinery and Equipment • Zone 1: no exemption except projects which export not less than 80 per cent • Zone 2: 50 per cent reduction except the following projects which will be granted full exemption: export not less than 80 per cent, locate in IEs • Zone 3: exemption for both target and general activities
Special Incentives (all projects located in Zone 3) • Business tax on sales: 90 per cent reduction for 5 years • Corporate income tax: 50 per cent reduction for 5 years; double deduction from taxable income of water, electricity and transport costs for 10 years; deduction from net profit of 25 per cent of costs of installing or building infrastructure
Other Incentives • For target activities in Zone 3: 50 per cent reduction of import duty and business tax on raw

materials used to produce for the domestic market; for 1 year; exemption of import duty and business tax materials used for manufacture of exports for 5 years

1989 to April 1993

Corporate Income Tax Exemption

- Zone 1: exemption of 3 years for projects satisfying one of the following: export not less than 80 per cent and locate in IE; produce or supply specific raw materials or parts and locate in IE
- Zone 2: 3 year exemption extendible up to 5 years for projects which earn foreign exchange, produce or supply specific raw materials or parts, an agro-based, use domestic supplies for at least 60 per cent of inputs, locate in IEs
- Zone 3: same as previous except general activities can obtain exemption for up to 8 years

Tax Exemption Machinery and Equipment

- Zone 1: no exemption except projects which export not less than 80 per cent or are classified under category 5.49; produce or supply specific raw materials or parts; locate in IE
- Zone 2: 50 per cent reduction except the following projects which would be fully exempted (export 80 per cent or more, are classified under category 5.49, produce or supply specific raw materials or parts, manufacture engineering products, an agro-based, use domestic supplies for at least 60 per cent of inputs, locate in IEs
- Zone 3: exemption for both target and general activities

Special Incentives (All projects located in Zone 3)

- Business tax on sales: 90 per cent reduction for 5 years
- Corporate income tax: 50 per cent reduction for 5 years; double deduction from taxable income of water, electricity and transport costs for 10 years; deduction from net profit of 25 per cent of costs of installing or building infrastructure

Other Incentives

- For target activities in Zone 3: 50 per cent reduction of import duty and business tax on raw materials used to produce for the domestic market for 1 year; exemption of import duty and business tax on raw materials used for manufacture of exports for 5 years

1993 onwards

Corporate Income Tax Exemption

- Zone 1: 3 years exemption if located in IE, promoted zone and export 80 per cent or more of industrial output; (if these criteria are not satisfied no exemption is granted)
- Zone 2: 3 years exemption extended to 7 years if located in an IE or promoted Zone
- Zone 3: 8 years tax exemption

Tax Exemption Machinery and Equipment

- Zone 1: 50 per cent reduction on machinery if located in IE, promoted Zone or if export 80 per cent or more of total sales as long as machinery is not included in the tariff reduction notification of the Ministry of Finance and subject to duty greater than or equal to 10 per cent of value
- Zone 2: 50 per cent import duty reduction on machinery subject to same restrictions as Zone 1
- Zone 3: exempt from import duty on machinery

Special Incentives

- Zone 3: double deduction from taxable income for water, electricity and transport costs for 10 years from the date of first sales; 25 per cent of the installation costs or construction costs associated with projects infrastructure facilities is deductible from net profit

Other Incentives

- Zone 1: exempt from duty on raw or essential materials used in export products for a period of one year, for projects exporting at least 30 per cent of total sales
- Zone 2: exempt from duty on raw or essential materials used in export products for a period of one year if export at least 30 per cent of total sales
- Zone 3: exempt from duty on raw or essential materials used in export products for five years if export at least 30 per cent of total sales; 75 per cent reduction of duty on raw and essential materials used for domestic sales production for five years, renewable annually

Source: Biggs et al. (1990, cited in Poapongsakorn and Fuller 1997, pp. 179-181).

five neighbouring provinces, Zone 2: ten provinces surrounding Zone 1, and Zone 3: the rest of the country plus the Eastern Seaboard Development Region.[10] Industries located in Zone 3 were entitled to obtain increased promotional privileges, such as reductions in import duties on raw materials and components and corporate tax exemptions for five years, whereas industries located in other zones were provided with less generous privileges (see Table 7.6 for more details). In general, since the mid 1980s the BOI ceased to grant investment privileges to projects located around Bangkok, but it has made exceptions for large export oriented firms with at least 200 employees. By the early 1990s, these restrictions became much more severe. For instance, under the criteria issued in 1993, certain industries would no longer be promoted if they were located in Zone 1, even if they were primarily exporters. Accordingly, promotional privileges are exclusively limited to textile producers located in Zone 3 and electronics firms locating in either Zone 2 or Zone 3 (Poapongsakorn and Fuller 1997, p. 157).

7.5 Conclusion

Like other developing countries, Thailand had predominantly been dependent upon agriculture when it began its industrialization process in the early 1960s. Within a short period of time however, Thailand has been able to achieve remarkable economic and industrial progress

Study of the incidence of industrial policies of Thailand reveals a number of distinguishing features, that again differ from other comparable countries on several accounts. Firstly, differences are evident in policy measures and applications, since the Government of Thailand has exercised limited control over industrial activities compared to countries like Korea and Malaysia. Thailand neither followed specific industrial plan nor followed industry specific intervention as intensively as in Korea. Secondly, in addition to export promotion, generation of employment and achieving economic growth, Thailand has made concerted efforts towards promoting spatial balance, primarily due to the concentration of manufacturing industries around the

[10] See UNIDO (1992, p. 70) for details.

vicinity of Bangkok. Thirdly, for her technology transfer needs Thailand also largely relies on foreign direct investment as did Malaysia.

Certain country-specific factors, such as an enthusiastic private sector, the degree of autonomy enjoyed by policy makers in decision making, the shared ideological values of the policy makers in terms of preference for market mechanisms, and governing structure of Thailand, which was also different from other comparable countries, have played a significant role in the industrial development process in Thailand.

The diversity apparent in policy measures and their applications across the three countries reviewed (Korea, Malaysia and Thailand) is likely to be significant in terms of the analyses of their industrial performance. Thus, an analysis incorporating these diversities may be necessary to obtain meaningful results in terms of the outcome or impact of industrial policies.

Part C: Measuring the Incidence and Effects of Industrial Policies: The Case Study of Korea

8. Measuring the Incidence

8.1 Introduction

As has been discussed in Chapter 1, the role of government in economic development, particularly in industrial development, has been one of the contentious issues in economics. It is widely acknowledged that there may be a wide range of deviations from the competitive market paradigm – sunk costs, economies of scale, oligopoly, externalities and complementarities, information and coordination failures, incomplete markets – which may justify government intervention to generate a more socially beneficial outcome. Yet, there has not been a consensus among economists on the potential role of government in achieving an improved outcome, even where market deficiencies occur. Some argue that deviations from the market paradigm are limited, and undue interferences from the government may lead to an ineffective outcome. By contrast, others argue that market failures are so pervasive in practice that in certain circumstances, government intervention can be effective.

Reaching a consensus view has become even more difficult, partly due to the lack of empirical evidence proving any of these theoretical arguments and partly due to the mixed results reported from the few existing empirical studies. This is particularly the case in regard to views supporting government intervention, to which this thesis pays particular attention. For instance, as it is clear from the discussions in Chapter 3, very few explicit empirical studies have been carried out which examine the economic effects of government intervention, in particular the effects of industry specific intervention. Moreover, these studies have so far failed to establish unambiguous conclusions regarding the effectiveness of industrial policies partly because of various empirical and conceptual shortcomings.

Firstly, the existing studies do not apply a uniform conceptual mechanism. The terms 'industrial policy' and 'industry specific intervention' are not only perceived differently but are also analysed with different analytical techniques. As is obvious from the discussion of existing empirical studies included in Chapter 3, the

methodological differences, arise from either the nature or the scope of the study, are in part responsible for generating mixed results for in terms of the effectiveness of policy. Secondly, given that with different interpretations and analytical techniques used the question of inconsistent results in terms of the effectiveness of policy outcome may not be surprising. Nevertheless, almost all the empirical studies generalised their specific results in terms of the effectiveness or ineffectiveness of industrial policies as a whole. These generalizations however, are questionable on several counts. Some empirical studies (Agrawal et al. 1996) derive their conclusions by comparing aggregate value-added and exports over various years. The improvement or decline of aggregate value-added or exports performances of a particular country has a limited value for assessing the effectiveness of industrial policies, since these indicators could be influenced by several other external as well as internal factors.

Moreover, the inferences made by the existing empirical analyses of industrial policies can be questioned on the grounds of their inability to incorporate the diversity of industrial policies into their analytical framework. As discussed in Chapter 2, in practice there are more complex situations than presumed by the theories. Against this background, it is necessary to pay due attention to the diversity of industrial policies, both for identifying industries that have been favoured over others and for analysing their true impact on the economy. However, the effects of government intervention have been evaluated by almost all the existing studies, without paying due recognition to the diverse aspects or the incidence of industrial policies.

Against this background what is now required is further empirical analyses that incorporate these diversity into their analytical techniques. Given the complex nature of these diversities, it may also be important to analyse the effectiveness of industrial policies on country-specific basis. As part of this process, this study will make an initial attempt to apply the broad methodology outline above (see Chapter 4) to evaluate the effectiveness of industrial policies in Korea.

The empirical analysis in relation to Korea, as noted in Chapter 4, will contain in three parts. The first part will include measuring the incidence of industrial policies and this chapter devoted to this task. Section 8.2 of this chapter includes a brief

review of diverse characteristics of sample countries. Section 8.3 contains the analytical techniques adopted for ascertaining the magnitude of industrial promotion. Incidence measures used as proxies for determining the magnitude of industrial promotion in present investigation will be organized under two categories as export promotion and growth related measures and import substitution related measures in this section. Chapter 9 will develop methods for assessing the potential outcome of industrial policy in Korea, while Chapter 10 will examine some evidence in relation to the role of industrial policies in generating these outcomes.

8.2 Diversity of Policies: The Republic of Korea, Malaysia and Thailand

Broadly speaking, all the sample countries under study started their industrialization processes by means of substituting imports, with the hope of satisfying domestic market needs and overcoming balance of payment problems. Realising the limitations of such approach with the passage of time, however, industrial policies were directed towards export promotion. Industrial activities relating both to import substitution and export promotion simultaneously continued in all three countries, with their priorities changing from time to time. In this process, Korea paid considerable efforts to achieving economic growth through its industrial policies while emphasizing the importance of national sovereignty and industrial deepening. Malaysia has given priority to redressing social imbalances – particularly towards stimulating Malay participation – over economic growth for almost two decades, through her process of industrialization. Thailand, while continuing both import substitution and export promotion, has made concerted efforts towards spatial balance, especially after mid 1970s, mainly due to the concentration of industries around Bangkok. Although it has paid greater attention to economic growth through industrial policies than Malaysia, industrial deepening has not given much consideration like Malaysia until late 1980s. Overall, it appears that Korea operated her industrial policies with clearly outlined objectives than did the other sample countries.

Apart from the deviations of objectives of industrial policies noted above, two other country-specific factors, namely industrial structure and the nature of the decision making process, which had a significant influence on the industrial development process of these countries, are worth mentioning. The industrial

structure of Korea is entirely different from that of other two countries. In Korea, the industrial structure is dominated by a small number of large firms – mainly by the *chaebols* which are family owned conglomerates. Though many private sector functions – ranging from planning, coordinating and even making decisions regarding industrial expansion – have been subjected to the scrutiny of the government, private sector initiatives can be largely credited for the continuous growth of Korean industries. This is particularly so in relation to their contribution to developing indigenous technology, innovative capacity and sustainable development in the industrial sector. As in Korea, the private sector, both foreign and local, continues to dominate the industrial sector in Thailand. However, the majority of these firms are of medium and small scale. On the contrary, state own enterprises play a major role in industrial activities until the mid 1980s, in Malaysia.

The decision making structure is another important ingredient in implementing industrial policies effectively, and is also one which varies considerably between these three countries. The centralized decision making structure of Korea, is staffed by the best managerial talent available in the economy, and is relatively free from strong pressure groups and enjoys a high degree of autonomy in decision making. These characteristics, together with sound institutional mechanisms enabled Korea to follow consistent and integrated approach as regards to industrial development. Like Korea, Thailand also possesses a decision making structure that is free from strong pressure groups. Policy makers thus enjoy a considerable autonomy, except indirect influences arising from corruption. Even then, distinguished characteristics of decision making process of Thailand, in particular the shared belief that market forces combined with prudent public sector infrastructure are important in achieving economic growth, prevent policy makers exercising undue influences on private sector decision making . Lack of integrated approach and of consistent views among the major institutions, such as National Economic and Social Development Board and Board of Investment, have however hindered the progress of its industrial development. In contrast to both these countries, interest groups are powerful in the economy of Malaysia. Due to the strong influence of interest groups Malaysian policy makers have been forced to place priority on achieving social objectives – especially the redistribution of wealth and of economic activity from non Malays to the Malay community – over economic efficiency

Apart from these country-specific variances, the measures applied for promoting industries also show significant differences across the three countries. All the sample countries, have relied on protective measures such as tariffs and quantitative restrictions and on various other generous incentives that stimulate export promotion, such as tax concessions, preferential loans and so on have been practiced elsewhere. In addition to these common measures, Korea has applied a number of intensive measures, including control over the allocation of loan funds, and state initiated mergers. In particular its application of administrative guidance – performance standards either setting export/production targets or rewarding winners and punishing losers – is most notable. None of these intensive measures have been applied to the same degree in either Malaysia or Thailand.

Differences are also evident between countries with regard to foreign direct investment and to fulfilling their technology transfer needs. As it is clear from Chapters 5, 6 and 7, all three countries have depended upon imported technology and foreign direct investment for their technology transfer requirements. However, the policy stance towards foreign direct investment in Korea has been somewhat less liberal than that of Malaysia and Thailand. In particular, the Korean government was interested in the quality of the foreign investment rather more than in the quantity of that investment. To ensure the full potential benefits of foreign direct investment were realised, the Government of Korea required foreign firms to adapt to national priorities, and foreign investment has been subjected to tight investment screening. Moreover, Korea has made concerted efforts to develop indigenous technology while copying foreign products through 'reverse engineering,' and with emphasis in R&D and human capital development. Instead of these extensive efforts, both Malaysia and Thailand have mainly relied on foreign direct investment for their technology transfer needs. Both these countries have promoted export promoting zones and bonded warehouses, for the purpose of attracting foreign direct investment in larger scale. Fewer efforts have yet been made by these countries towards improving indigenous technology and towards also obtaining the full potential benefits of foreign direct investment. The relative absence of such measures in these countries could partly be attributed to the lack of skilled manpower capable to develop indigenous technologies and to monitor technology transfer agreements.

A somewhat similar story is evident as regards to industry specific intervention also. As it is clear from the discussion included in Chapter 5, among Asian countries Korea applied industry specific intervention most vigorously, more often with strong preferential treatments of related industries. Over the period 1973-81, Korea deliberately encouraged heavy and chemical industries, which were capital and knowledge intensive in nature. The criteria for selecting these industries, though not always made explicitly clear, in general favoured industries which were seem to have future growth potential, long-term competitive advantage and linkage effects on other industries. When compared to Korea, industry specific intervention was not so intensive in both Malaysia and Thailand. Through its industry specific intervention policies, Malaysia has placed significant emphasis on promoting resource based industries (since early 1980s), in addition to the some heavy industries which are capital intensive. As a country well endowed with natural resources, Malaysia considered that promoting resource based industries provided an avenue for gaining comparative advantage and enhancing linkage effects. As it is clear from Chapter 7, the concept of industry specific intervention is rarely used in the literature for describing industrial policies in Thailand. Nevertheless, it is impossible to deny the existence of some industry specific intervention, given the presence of promotional privileges in Thailand. By providing these promotional privileges, Thailand expects to promote industries that possess growth potential. As industrialization progressed, these promotional privileges have been increasingly directed towards achieving spatial balance. In light of these factors it is clear that industry specific intervention has not been exclusively limited to capital and knowledge intensive industries in both Malaysia and Thailand. These characteristics further suggest that sector selection has not been common across the three countries.

In the light of these factors it is clear that it is not appropriate to put all countries into one basket as far as the incidence of industrial policies are concerned. Put it another way, countries undertake highly individualistic industrialization programs. Though there are some common elements between countries, it appears that country-specific factors, policy measures applied and sectors identified for support, differ significantly between these sample countries. To evaluate the effectiveness of industrial policies, therefore, it is important to take into account these

diversities. With this task in mind, an alternative analytical method is adopted in the following section to measure the incidence of industrial policies in the case of Korea.

8.3 Empirical Assessment of Incidence Measures

The broad incidence of industrial policies in Korea, in particular in regard to the purposes for which industrial policies have been pursued, the industries to which they have been applied, the policy instruments which have been used, and the way in which these instruments have changed from time to time over the period 1960-1997, have been discussed in detail in Chapter 5. Supplementing this qualitative analysis, an attempt will be made here to assess the impact of incidence of industrial policies quantitatively.

To carry out this task meaningfully, detailed quantitative analysis of incidence measures and of industrial performance over a long period, and at a disaggregated level, would be appropriate. However, this case study has been of necessity undertaken without access to the unpublished data resources of the Korean Government and its agencies. Relying only on published sources seems that finding data representing incidence measures at disaggregated level is a difficult task, and this is true also for data representing industrial performance indicators such as value-added, and exports at disaggregated industry level over long period of time. Subject to these data constraints, an initial empirical investigation of incidence measures for these at disaggregated level is carried out in the following section, while performance measures are addressed in Chapter 9. Given the data limitations, these analyzes can be taken as illustrative only. But they are intended to show that a detailed application of the proposed methodology, using access to unpublished data sets, would be valuable in terms of the empirical assessment of the impact of industrial policies.

As part of this empirical assessment, an attempt will be made to assess the magnitude of industrial promotion in each industrial sector (at two-digit ISIC level). For this task, the dynamic characteristics of a number of selected industrial policy measures, which have been used to stimulate industrial development, will be reviewed. The primary purpose of this exercise is to ascertain the extent of industry specific intervention at disaggregated level, while incorporating the diverse

characteristics of industrial policies into the analytical framework. With the aid of these incidence measures an analytical framework will be set up so as to separate highly promoted industries, by various criteria, from less promoted industries.

8.3.1 Assessing the Magnitude of Industrial Promotion with Incidence Measures

There is ample evidence, reviewed in Chapter 5, that Korea played an intensive role in planning, monitoring and inducing private firms to invest in targeted industries. However, it is much less clear in detail which industries were promoted, and to what extent they were promoted at the expense of others in given periods. In general, the available empirical literature (see Chapter 3) cites the heavy and chemical industries as the ones which have been largely promoted through preferential treatments relative to other industries. Except for the fact that these heavy and chemical industries are specified as targeted industries in the development plans (see Table 5.3), one can not find logical evidence justifying this general perception. In contrast, some others (Rodrik 1994b; Hong 1979) point out that preferential treatment has also been given to light manufacturing industries, such as textiles and clothing and electronics. The ambiguity regarding the targeted industries remains partly because of the lack of measurement criteria for identifying preferentially treated industries from others. More specifically, no attempt has yet been made to determine the extent of preferential treatment, other than stating that certain industries have been preferentially treated through financial, tax and other incentives.

To be able to decide which industries were preferred, and the extent of preferential treatment some kind of measurement criteria are therefore required. For this task, this study will develop incidence measures as proxies for measuring the magnitude of industrial promotion in particular industries, at particular times. Given the comprehensive, dynamic nature of industrial policies as discussed in Chapters 2 and 4, setting up a framework for analytical purposes becomes a difficult task. Nevertheless, incidence measures, which represent proxies for evaluating the magnitude of industrial promotion, will be organised under two broad criteria, namely export promotion and growth measures and import substitution measures.

The organization of incidence measures under these two broad criteria is due to two main reasons. Firstly, these two categories represent Korea's major policy goals over the period being studied. As the available evidence suggests, Korea pursued its industrialization process for the purpose of achieving the primary objectives of increasing exports, enhancing other growth related measures such as developing technological capability and achieving self-sufficiency in certain industrial products. For instance, as noted in Chapter 5, the most important policy goals that were outlined in the consecutive Five Year Development Plans in Korea were (1) export promotion and growth in the manufacturing sector (2) the promotion of industrial self sufficiency in selected heavy and chemical manufacturing industries and (3) technology development (Suh 1981; Hong 1979).

These policy priorities have been encouraged through various measures including financial and tax incentives, subsidies and protective measures. Ample evidence suggests (Lee 1987; Sakong 1993) that these incentive measures, were more often subjected to the fulfilment of policy priorities such as promoting exports, value-added and propagate technologies. For example, preferential loans were largely allocated to preferred industries depending on their ability to satisfy export targets. Likewise, a varying combination of tax, financial and tariff incentives has been used in Korea to achieving its desired goals.

Secondly, these two categories reflect the two major types of policy measures used in Korea. Korea often applied both import substitution and export promotion measures simultaneously, but with varying degree of intensity in different policy periods. As discussed in Chapter 5, Section 5.2, Korea has undergone four major policy reforms during the period 1960-97: the import substitution phase (1950-1960); the export oriented (light) industrialization phase (1961-72); the Heavy and Chemical industry phase (1973-1981); and the stabilization phase while eliminating industry specific intervention (1982 onwards). Of these, the first three phases, particularly the period between 1961-81 are most notable as far as the industrialization process in Korea is concerned. In the subsequent period, beginning with 1982, Korea began to reverse its existing policy package. For example, with the stabilization measures introduced in 1982, the importance of industry specific intervention began to diminish

gradually over the time, with the policy emphasis shifting to a functional approach and liberalization.

In its initial stage of industrialization, until the 1960s, policy instruments were biased towards protective measures. By imposing quantitative restrictions and high tariffs, import substitution in light manufacturing industries, such as textiles and clothing, and food were promoted during this period. Export promotion policies became prominent as time passed, and as a result analysts began to identify the period after 1962 as the export oriented growth phase in Korea's development. Although the policy emphasis has shifted towards export promotion, Korea continued its import substitution focus, with the objective of reducing Korea's import dependence on heavy and chemical products. This was carried out selectively by the use of various promotional measures including (1) income and other business tax exemptions and reductions, (2) generous depreciation allowances, (3) an investment-tax deduction system, under which capital investment could be used to reduce taxable income, (4) long-term preferential loan provisions, (5) tariff protection and import restriction measures and (7) an industrial park system, by which the government provided such facilities as electricity, railway transportation facilities, bridges, the sanitary and sewage system, and the water system (Suh 1981; Hong 1979).

Due to the factors noted above, and considering the importance attached to the simultaneous application of both export promotion and import substitution measures, the inclusion of both export promotion and growth measures and import substitution measures is important to ascertain the magnitude of industrial promotion. However, this task is severely constrained by the lack of published data on incidence measures at the sectoral (disaggregated) level. Therefore the quantitative analysis of incidence measures will be limited to the period 1960-1981.[1] The selection of this period is primarily due to the lack of data representing incidence measures at the sectoral level. But, as previously noted, this period may be viewed as the most important period, as far as measuring the incidence of industrial policies is concerned, because of the active government intervention and the adoption of intensive measures in this period.

[1] Due to the unavailability of data, in some cases the closest available year is taken as a proxy.

(i) Export Promotion and Growth Related Measures

In this section an attempt will be made to examine the extent of industrial promotion received by each industrial sector at the two-digit level through export promotion and growth related measures. Two proxies, namely financial and tax incentives and incentives and associated measures related to technology development, will be included in this category to represent incidence measures and thereby to ascertain the extent of industrial promotion of each sector under certain assumptions. These cover the incentives that have been applied to promote exports, generate value-added and enhance technology. The evidence included in Chapter 5 suggests that financial and tax incentives have been largely directed towards export promotion. In addition, contrary to the prevailing practices in other countries, many of the import substitution industries in Korea have been encouraged for producing for export markets from the inception. On these grounds, it is reasonable to assume that most of the tax and financial incentives and the technology related measures have been applied for the purpose of promoting exports and growth.

It is important to note, however, that drawing clear boundaries between export promotion and growth related measures and import substitution related measures is a difficult task in the case of Korea, since it has applied both measures simultaneously. Therefore treating tax and financial incentives and measures related to technology development as export promotion and growth related measures must be undertaken subject to qualifications.

(a) Financial and Tax Incentives

Theoretically, investment incentives are supported on the basis of market failure arguments arising from externalities from production. Since externalities create benefits that cannot be captured by the producers that generate the spillovers, they create a "wedge" between the private and social rates of return. It is argued that, under these circumstances, an incentive to private investors up to the amount of this "wedge" might be warranted, to optimize total net benefits to society (UNCTAD 1996, p. 9). Nevertheless, as we have seen, counter arguments can also raised against

these incentives, stating that they may introduce distortions in the production structure and also lead to unfair trade practices.

In practice, investment incentives are widely used in developing countries as a tool for stimulating industries. The case of Korea provides several examples of this nature. Efficient allocation and maximum mobilization of capital resources were deemed necessary for Korea, due to chronic capital shortages since the initiation of its modernization process. Various policy tools were adopted by the government in this regard, ranging from direct government investment in some sectors to more sophisticated indirect incentives. The latter included generous financial and tax incentives that were directed towards promoting priority industries and desired goals, especially the promotion of exports. Despite widespread application of these incentives, finding published data at the sectoral level has been a difficult task. Therefore a proxy will be used in this study to represent these incentives, subject to certain assumptions.

To represent both financial and tax incentives, the sectoral level cost of capital estimates which are available from a comprehensive study "Public Policy, Corporate Finance and Investment" carried out by Kwack (1985) will be applied in this study. These data are the best available source to date, since they cover all aspects of financial and tax incentives. For example, when estimating financial incentives, this study has taken into account the details such as the interest rate differential between policy loans and general loans, the proportion of policy loans (such as export loans), depreciation rates and inflation. Similarly, when estimating tax incentives, the details such as the statutory maximum corporate tax rates, surtax rates, investment tax credits, tax holidays and direct exemptions from tax etc. have taken into account.

However, it is important to note that these cost of capital estimates have been derived in this study under several assumptions and through various stages of estimation. Owing to the lack of detailed historical data on the performance of various tax incentives, for instance, this study has largely resorted to the statutory information and has ignored incentives for small and medium sized firms. When estimating the cost of capital, it assumed that Korean firms resort to the curb market for a marginal increase in their investment financing. With these assumptions, the

cost of capital estimates denote the marginal cost of capital of large corporations in Korea.

These cost of capital estimates for Korea are reported in the Kwack study at the three-digit ISIC level, for three types of assets, for the period 1960-83. For the present investigation, these data have been adjusted at the two-digit ISIC level while adding three types of assets together. These data are then used to estimate the subsidy effects as outlined below.

Measures of the distortions introduced into the cost of capital by government policies are calculated for each industrial sector in this study by taking the difference between a base cost of capital and the net estimated cost of capital. Thus, to obtain a measure of the subsidy effects, the cost of capital of each industry is estimated relative to the industrial sector with lowest cost of capital, which is paper and paper products. The subsidy effects shown in Table 8.1 are measured relative to the cost of capital in this base industry, and will understate the true subsidy effect to the extent that there were some subsidies to this industry. It is assumed that this industry specific subsidy effect can be used as a measure of the financial and tax incentives received by that particular industrial categories.

The primary objective of this exercise, as noted earlier, is to ascertain the extent of industrial promotion through financial and tax incentives which are taken to be targeted at promoting export and growth. As can be seen in Table 8.1, and also Chart 8.1, three industrial sectors – Basic Metal, Fab. Metal and Chemicals[2] – have enjoyed more privileges in terms of tax and financial incentives than other industries. Overall, these data suggest that, through tax and financial incentives, Korea favoured those three industries more than other industries.

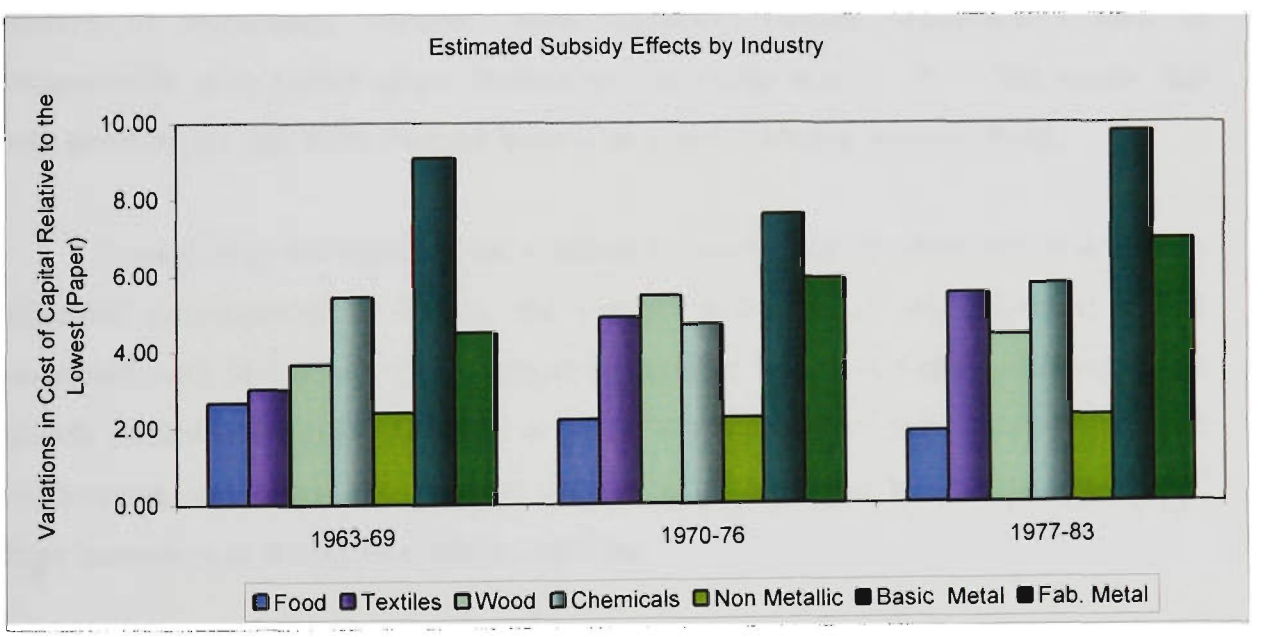
[2] Hereafter, industrial sectors will be indicated with a short version as appears in Chart 8.1.

Table 8.1 Estimated Subsidy Effects by Industry, 1963-1983

Sector	1963-69	1970-76	1977-83	Average
Food Beverages & Tobacco	2.66	2.20	1.86	2.24
Textiles Wearing Apparel & Leather	3.02	4.87	5.50	4.46
Wood & Wood Products	3.68	5.45	4.41	4.51
Paper & Paper Products	0.00	0.00	0.00	0.00
Chemical & Chemical Products	5.44	4.69	5.74	5.29
Non Metallic Mineral	2.40	2.23	2.27	2.30
Basic Metal	9.08	7.60	9.77	8.82
Fabricated Metal	4.48	5.90	6.93	5.77

Source: Estimates of the author, based on capital cost estimates from Kwack (1985, p.103-110).

Chart 8.1



Source: As for Table 8.1.

(b) Incentives and Associated Measures Related to Technology Development

For the purpose of enhancing technology development, countries use a variety of techniques such as promoting foreign direct investment, joint ventures, technology licensing and subsidies for R&D. Developing countries, which are lacking the required knowledge, skills and experience with compared to developed countries, tend to vigorously promote these techniques, in addition to providing generous fiscal,

financial and other incentives such as subsidized infrastructure. In fact, the range of incentives available to multinational corporations, and the number of countries that offer such incentives, have increased considerably over the last two decades. In addition, many countries, especially developing countries, are using these incentives as tools of an overall industrial policy, linking such incentives to different objectives, mainly targeting investment activities to boost exports, technology and high value-added.

As a latecomer, Korea has also depended on foreign technology and used tax and financial incentives to promote industries that introduce and propagate advanced technologies. However, as noted in Chapter 5, the Korean policy stance towards promoting technology differs from other developing countries in certain respects. Firstly, they did not encourage foreign direct investment on a large scale as did other countries. Secondly, attempts were always made by Korea to maximize the potential benefits of technology transfer, while imposing certain requirements such as compatibility with policy goals, technology screening and so on. That means that only investments that were deemed beneficial to the economy were allowed.

Considering the significance attached to technology development and thereby industrial development in Korea, the present investigation will select measures associated with technology development as another aspect of export promotion and growth related measures. Needless to say, the practical difficulties associated with constructing such measures, specially the lack of data and the lack of transparency of these incentives at the sectoral level, is severe.

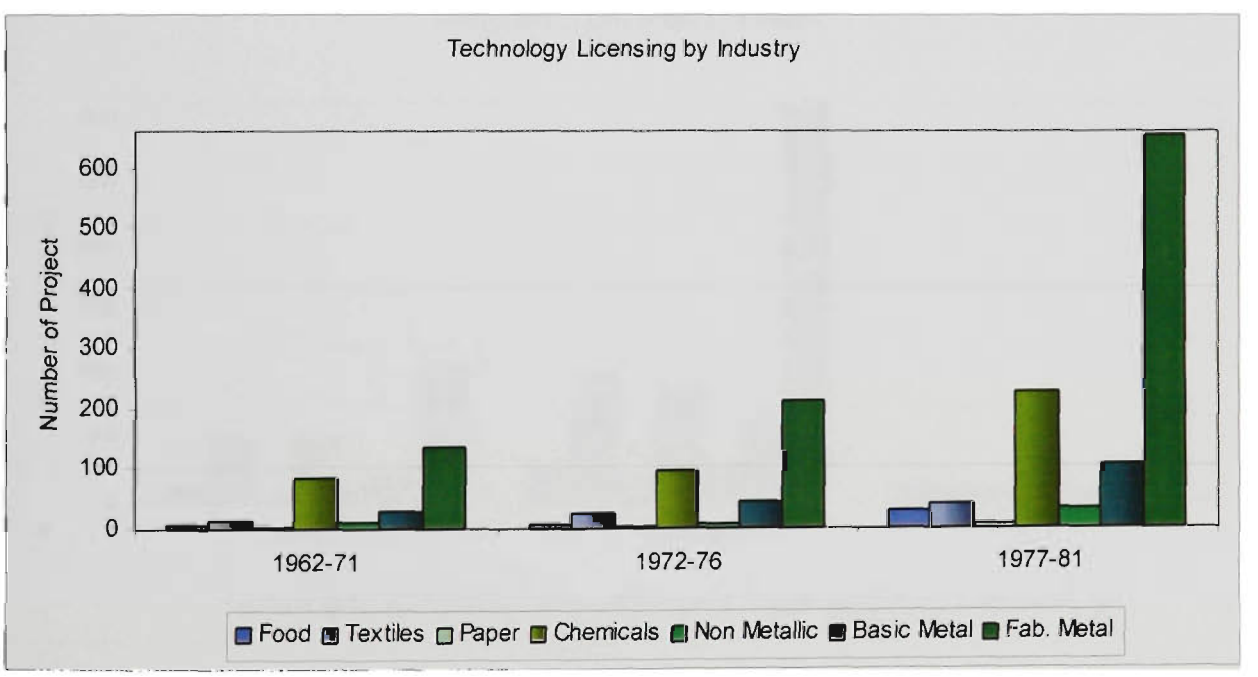
Subject to these limitations, data representing number of foreign direct investment and technology licensing projects, presented in the study of Lee (1988) will be selected as a proxy for the extent of industrial promotion by these reasons. These data will be used here under the assumption that they reflect the policy priorities of Korea, especially promoting technology development. It is also assumed that the number of projects, in a given industry in a given period, can be taken as a measure of the incentives provided or the priority attached to that particular sector. Given that no information available on the aspects of these projects (scale, intensity and cost), this clearly a large but necessary assumption.

Table 8. 2 Number of Technology Licensing Projects, 1962-1981

Sector	1962-71	1972-76	1977-81	Total
Food Beverages & Tobacco	8	7	30	45
Textiles Wearing Apparel & Leather	14	24	41	79
Wood & Wood Products	0	0	0	0
Paper & Paper Products	4	3	7	14
Chemical & Chemical Products	83	93	225	401
Non Metallic Mineral	12	9	34	55
Basic Metal	29	45	105	179
Fabricated Metal	135	210	653	998

Source: Ministry of Finance as cited in Lee (1988, p. 190).

Chart 8.2



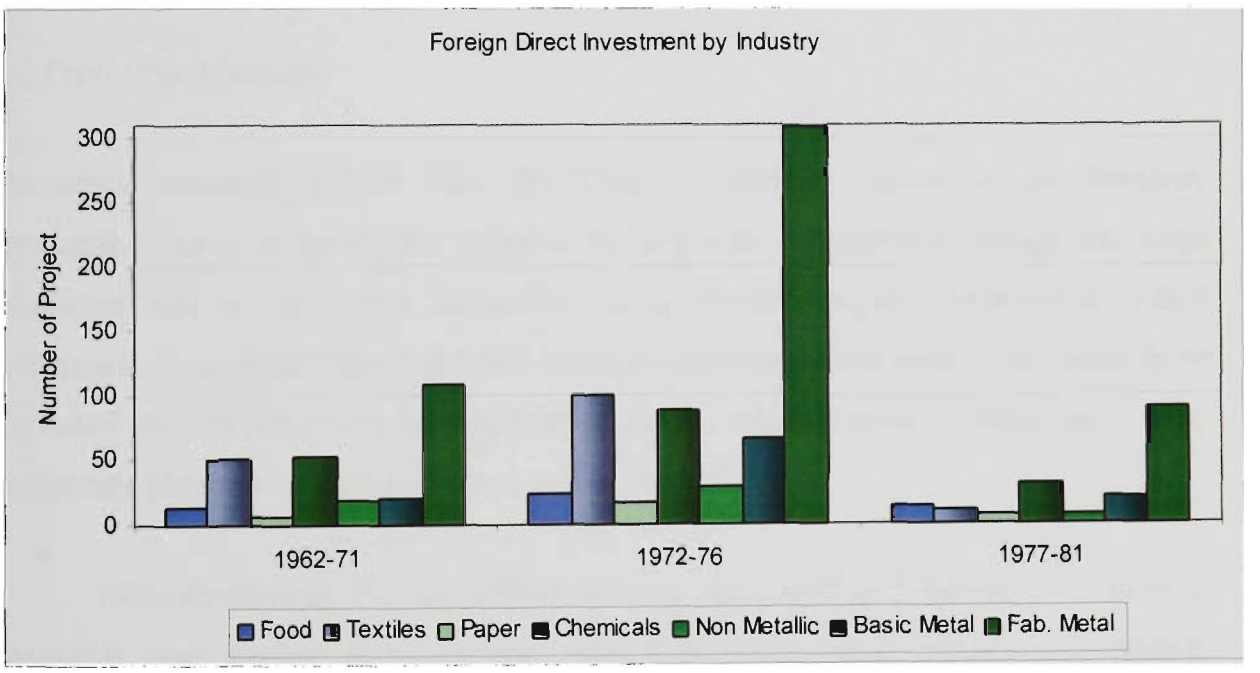
Source: As for Table 8.2.

Table 8. 3 Number of Foreign Direct Investment Projects, 1962-1981

Sector	1962-71	1972-76	1977-81	Total
Food Beverages & Tobacco	13	24	13	50
Textiles Wearing Apparel & Leather	50	100	10	160
Wood & Wood Products	0	0	0	0
Paper & Paper Products	7	17	6	30
Chemical & Chemical Products	53	88	31	172
Non Metallic Mineral	18	28	7	53
Basic Metal	20	66	21	107
Fabricated Metal	109	308	89	506

Source: Ministry of Finance, as cited in Lee (1988, p. 190).

Chart 8.3



Source: As for Table 8.3.

Thus the data presented in Table 8.2 and 8.3, and in Charts 8.2 and 8.3, can be taken as a rough indicator of the level of industry specific intervention, in terms of the number of technology licensing and foreign direct investment projects. Both indicators again reveal comparatively higher preference to the three industries noted above – Fab. Metal, Chemicals and Basic Metal – relative to the light industrial

categories. The Fab. Metal sector has attracted the highest number of both technology licensing (998 projects) and foreign direct investment projects (506 projects) during the period 1962-81. The other most preferred sectors in terms of technology include Chemicals and Basic Metal sectors. The former has obtained 401 technology licensing projects and 172 direct investment projects, while the latter has attracted 179 technology licensing projects and 107 foreign direct investment projects. These data also implicitly suggests the growing importance of technology licensing relative to that of foreign direct investment, since there were relatively higher proportion of technology licensing projects than that of foreign direct investment, especially after early 1970s. But any such conclusion must be tempered by the absence of any scale data for individual projects, either on the value of the technology licensed or the level of foreign investment.

(ii) Import Substitution Related Measures

(a) Protective Measures

Protective measures, which have the effect of creating incentives for domestic production, have been largely applied by countries to address foreign exchange problems and to stimulate industries, in particular import substituting infant industries. In general it is argued that a newly created industry cannot immediately be expected to compete with its established rivals and therefore requires an initial, temporary phase of special assistance and/or protection.

Notwithstanding the theoretical debates discussed in Chapter 1, protective measures were applied in Korea, like many other developing countries, to address foreign exchange deficiencies and to stimulate industries, in particular import substituting infant industries. Hence, domestic markets were sheltered through the increased price of imported goods, either through direct quantitative restrictions or through the imposition of customs duties upon them. To ascertain the magnitude of protection received by each industrial category, tariff and non-tariff barriers data presented in the study of Kim (1988) will be used here as a mean of representing import substitution measures. The available evidence suggests (Chapter 5) that some

industries, in particular import substituting industries, have been protected more extensively than other industries.

The average tariff rates data obtained from Kim (1988) have been estimated by dividing actual collections of tariff revenue by the value of commodity imports. Though the effective rates would have been more suitable for meaningful evaluation, such information was not available at the disaggregated level. Thus the data reported in the Kim study at the three-digit level on Korean Standard Industry Classification were adjusted for the present investigation on ISIC classification at two-digit level.

Table 8. 4 Average Tariff Rates by Industry, 1966-1983 (per cent)

Sector	1966	1970	1975	1980	1983
Food Beverages & Tobacco	128	95	88	81	81
Textiles Wearing Apparel & Leather	78	97	78	53	53
Wood & Wood Products	59	63	57	43	43
Paper & Paper Products	44	48	41	27	27
Chemical & Chemical Products	34	46	36	28	28
Non Metallic Mineral	54	60	53	37	37
Basic Metal	38	42	40	26	26
Fabricated Metal	35	37	31	25	25

Source: (Kim 1988, p. 90).

The resultant data are presented in Table 8.4. Accordingly, light manufacturing industries such as Food and Textiles have been protected through tariff measures more than other sectors. Though the overall protection provided through tariff measures has been declining over the years, the average tariff rates have remained quite high for these two sectors until the 1980s. The average tariff rates for heavy and chemical industrial categories are relatively low when compared to the rest of the industrial sectors.

Non-tariff barriers data, obtained from Kim (1988) indicates the degree of import restrictions by industry. These data are presented in Table 8.5. As these data

illustrate, during its initial stage of industrial development until mid 1970s Korea, has widely applied non-tariff barriers as a tool of promoting industries. Though the number of commodities that have been subjected to non-tariff barriers has decreased substantially since early 1980s, a considerable number of commodities in the Food, Textiles, Chemicals and Fab. Metal industries were protected through these measures even after 1980. Due to the inconsistent and irregular pattern of non-tariff barriers, however, it is difficult to derive a conclusion in relation to industrial promotion from these figures.

Table 8.5 Non-Tariff Barriers by Industry, 1966-1983 (per cent)

Sector	1966	1970	1975	1980	1983
Food Beverages & Tobacco	91	92	86	71	71
Textiles Wearing Apparel & Leather	98	79	75	29	29
Wood & Wood Products	93	49	40	28	15
Paper & Paper Products	98	65	68	28	7
Chemical & Chemical Products	88	67	67	57	38
Non Metallic Mineral	94	20	22	6	5
Basic Metal	93	34	32	15	8
Fabricated Metal	98	59	72	58	46

Source: Kim (1988, p. 34).

Table 8.6 demonstrates the protective measures consolidating both tariff and non tariff barriers data,[3] obtained from Kim (1988). As the figures in this table indicate, almost all the industrial sectors in Korea, regardless of whether they are light or heavy and chemical industries, were significantly protected through tariff and non tariff measures in the 1960s. Thus, these figures partly reflect the significance of the import substitution strategies followed in early period. After 1970, as the data in Table 8.6 illustrate, the role played by protective measures was gradually diminishing. Partly, this reduced role of protective measures could be attributed to the change of the policy regime from import substitution to export promotion.

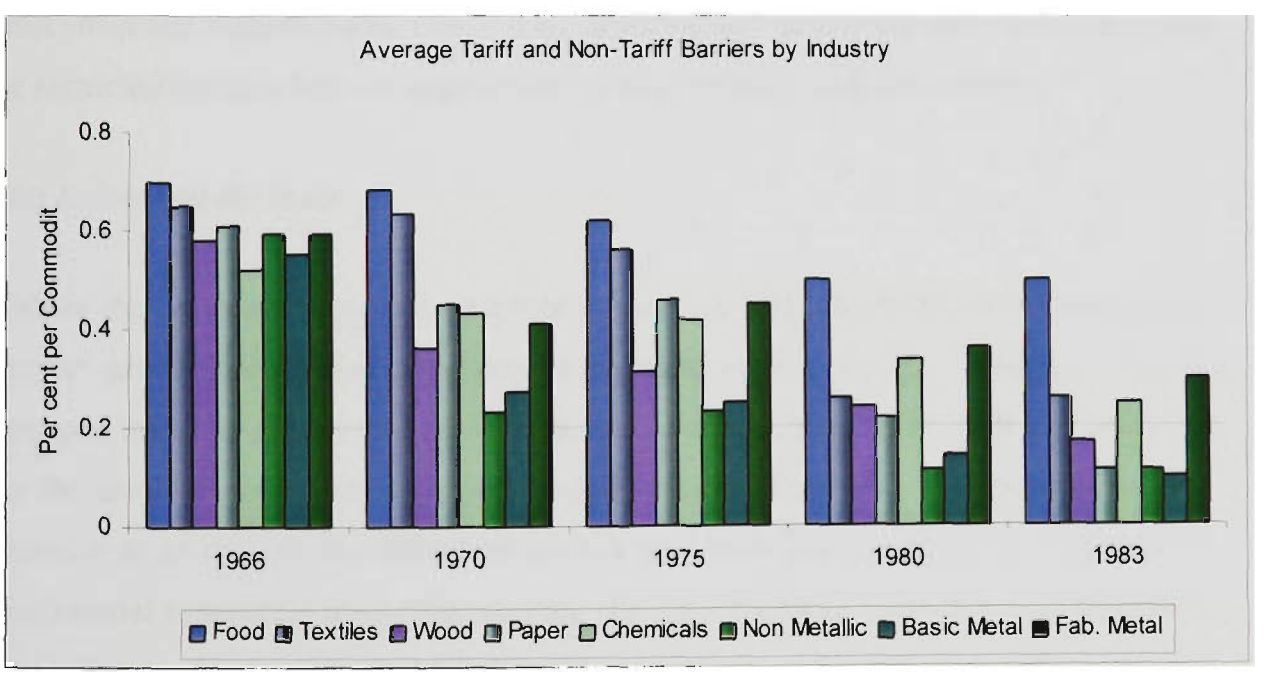
[3] See Appendix 8.1 for the estimation procedures adopted for obtaining these data.

Table 8. 6 Tariff and Non-Tariff Barriers by Industry, 1966-1983 (per cent)

Sector	1966	1970	1975	1980	1983
Food Beverages & Tobacco	0.70	0.68	0.62	0.50	0.50
Textiles Wearing Apparel & Leather	0.65	0.63	0.56	0.26	0.26
Wood & Wood Products	0.58	0.36	0.31	0.24	0.17
Paper & Paper Products	0.61	0.45	0.46	0.22	0.11
Chemical & Chemical Products	0.52	0.43	0.42	0.34	0.25
Non Metallic Mineral	0.59	0.23	0.23	0.11	0.11
Basic Metal	0.55	0.27	0.25	0.14	0.10
Fabricated Metal	0.59	0.41	0.45	0.36	0.30

Source: Kim (1988, p. 35).

Chart 8.4



Source: As for Table 8.6.

Overall, the data presented in Tables 8.4, 8.5 and 8.6, and in Chart 8.4 demonstrates the variation in the protective measures among different industrial sectors and over time. Accordingly, promotion of industries through protective measures appears to be more biased towards light industries such as Food and Textiles

sectors. Yet, some heavy and chemical industries, – Fab. Metal and Chemicals – have also been protected significantly through protective measures.

Since these protective measures are applied for dual purposes – promoting industries and for saving foreign exchange – conclusions based on protective measures should require a caution. For example, as Hong (1979, p. 108) noted:

> the protection of import competing goods such as textiles began in the fifties and has continued into the seventies. The fact that those products which are now Korea's major export items, such as textiles, are still protected by severe (tariff and) quantitative import restrictions may reflect pressure from the manufactures who are afraid of conspicuous consumption of foreign goods by the well-to-do. It also probably reflects the desire of the government to prevent even a small amount of foreign exchange "waste" on what are considered to be non-essential imports.

Although the general perception – heavy and chemical industries were promoted more than that of light industries during the 1973-81 (high intervention) period is not strongly supported by these data,[4] ample evidence suggests (Suh, 1981; Hong 1979; Yoo 1991) that most of the machinery, automobiles, ships, electrical machinery, chemicals (organic and inorganic) petrochemical products and many miscellaneous manufactures which were domestically produced were not only listed as restricted but also had the largest number of prohibited and quota items.

(iii) Estimating the Rank

Taking the incidence measures on export promotion and growth related measures and import substitution related measures as a guide, in this section, industries will be grouped into two groups as highly promoted and less promoted industries according to the level of promotion received by each industrial sector. The purpose of this exercise is to identify the industrial sectors that have been particularly subjected to preferential treatments over other sectors. For this purpose, industries will be ranked according to the magnitude of industrial promotion, under the assumption that the higher the incentives received by each industrial sector the higher was the promotion of such industrial sectors. The estimated ranks are presented in Table 8.7 and 8.8.[5]

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[4] However, this statement must be treated with some caution, as Lee (1996) state because of tariff exemptions on imported materials for export firms and key industries, the actual tariff rates have been substantially lower than the official rates.

[5] Procedures adopted in ranking industries will be explained in Appendix 8.1.

The rank appearing in the second column in Table 8.7, is derived from the data contained in the fourth column of Table 8.1. The corresponding ranks were estimated under the assumption that the higher the subsidy effects on particular industrial sectors the higher will be the incentives or the extent of industrial promotion received by each industrial sector. For example, the Basic Metal sector had the highest average estimated subsidy effect, as shown in Table 8.1, and it was assigned the highest rank (8).

The third column – technology measures – appearing in Table 8.7 is estimated by taking into account fourth columns of both Tables 8.2 and 8.3. The corresponding ranks were obtained here under the assumption that the higher the incentives provided, or the priorities attached in attracting technology licensing/foreign direct investment, the higher will be the number of projects. For example, the Fab. Metal sector has attracted the highest number of technology licensing as well as foreign direct investment projects. Therefore this sector has assigned the highest rank (8).

Table 8.7 Rank of Industries on the Basis of Export Promotion and Growth Related Measures

Sector	Tax/Financial Incentives	Technology Measures	Overall Composite Rank
Highly Promoted			
Fabricated Metal	7	8	7.5
Basic Metal	8	6	7.0
Chemical & Chemical Products	6	7	6.5
Textiles Wearing App. & Leather	4	5	4.5
Less Promoted			
Non Metallic Mineral	3	4	3.5
Wood & Wood Products	5	1	3.0
Food Beverages & Tobacco	2	3	2.5
Paper & Paper Products	1	2	1.5

Source: Table 8.1, 8.2 and 8.3.

To determine the overall ranking in terms of promotion received by each industrial sector on the basis of export promotion and growth related measures, consolidating both of these incidence measures, the overall composite rank has been estimated by taking an average figure of the ranks appearing in columns 2 and 3. As indicated in column 4, Table 8.7, four industrial sectors – Fab. Metal, Basic Metal,

Chemicals and Textiles – have been promoted more than other sectors on the basis of export and growth related measures. These results thus broadly confirm the general perception, that heavy and chemical industries have been promoted over the others for these policy measures.

Table 8.8 demonstrates the industries that have been largely promoted through import substitution related measures. The ranks appearing in this table are estimated using the data presented in Table 8.6, since those measures reflect both tariff and non-tariff barriers.[6] These ranks are estimated under the assumption that the higher the protection received by each industrial sector the higher will be the industrial promotion.

The rankings of industries on the basis of import substitution related measures, as shown in Table 8.8, indicate that two light industries, – Food and Textiles – and two heavy and chemical industries – Fab. Metal and Chemicals – have been promoted more extensively over the others.

Table 8.8 Rank of Industries on the Basis of Import Substitution Related Measures

Sector	Protective Measures
Highly Promoted	
Food Beverages & Tobacco	8
Textiles Wearing App. & Leather	7
Fabricated Metal	6
Chemical & Chemical Products	5
Less Promoted	
Paper & Paper Products	4
Wood & Wood Products	3
Basic Metal	2
Non Metallic Mineral	1

Source: Table 8.6.

Overall, it appears (as the rankings of Table 8.7 and Table 8.8 indicates) that two heavy and chemical industrial sectors (Fab. Metal, Chemicals) have been more

[6] See Appendix 8.1 for the procedure adopted for ranking import substitution related measures.

heavily promoted than other industries, through both export promotion and growth related measures and import substitution related measures. Further, the comparatively higher ranking of the Textiles sector suggests that Korea's preferential treatments has not at all been limited exclusively to the heavy and chemical industries. While, because of the highly aggregate nature of the industrial classification (two-digit level) and also the limitation of the data, though it is difficult to derive a firm conclusion, these results suggests that the general perception of considering heavy and chemical industries as the promoted industries in Korea can be misleading.

8.4 Conclusion

The preceding section of this chapter has assessed the magnitude of industrial promotion with the aid of incidence measures, which are organized under two broad policy categories, namely export promotion and growth related measures and import substitution related measures. This analysis reveals several important points.

Firstly, it appears that there is no consistent pattern across different types of incidence measures applied for industrial promotion. Of the three incidence measures applied, tax and financial incentives and the measures adopted for promoting technology development, our results indicate that they are biased towards promoting Heavy and Chemical industries. On the contrary, protective measures were tilted towards promoting industries like Food and Textiles. However, caution is required regarding these conclusions, since the data representing incidence measures are proxies and are applied here under certain assumptions, and therefore may not reveal the true picture of the incidence of industrial policy.

Secondly, these incidence measures appear to be dynamic. They are quite frequently subject to change, not only from one industrial sector to other but also with the time. These characteristics may partly attributed to changes in policy direction and also to other social and economic adjustments.

Thirdly, when the overall impact of industrial promotion is assessed by combining both export promotion and growth related and import substitution related measures, it is evident that combination of both heavy and chemical and light

industries have been promoted over the others in the case of Korea. But the comparatively high level of promotion received by the Textiles sector suggests that industry specific intervention has not been exclusively limited to the heavy and chemical sector.

Overall, this analysis of incidence measures suggests that, due to the dynamic nature of incidence measures, and their variation across industries, to understand the impact of industrial policies it is important to identify the magnitude, timing and the direction of industrial promotion. Studies which attempts to assess the impact of industrial policy without undertaking a detailed incidence analyses are likely to give misleading results.

Appendix 8.1 Estimation Procedures

Number of technology licensing and direct foreign investment projects appear in Tables 8.2 and 8.3 respectively, which were obtained from Lee (1988) have been reported at two-digit level. However, several adjustments have been made with regard to these data since the reported data were not accorded with ISIC classification. There were no technology licensing or direct foreign investment projects under the category of Wood & Wood Products.

Data appears in Tables 8.4, 8.5 and 8.6 which were available in Kim (1988) at three-digit levels were adjusted for two-digit levels for the present study. Data in Table 8.6, have been calculated by applying the method used by (Lee 1996), since original data indicates the rate of import liberalization in percentages. Following Lee thus the resultant data reported in Table 8.6 were calculated as (100 – the rate of import liberalization) and presented as per cent.

Since the data in Table 8.6 vary from time to time, to estimate the rankings appear in Table 8.8, firstly the rankings were estimated for each year indicated in Table 8.6 separately. Next, taking the average of all the five resultant rankings, the estimates appear in Table 8.8 were obtained.

9. Identifying Potential Outcome

9.1 Introduction

As noted in earlier chapters, many factors affect economic outcomes in a particular country, both in overall terms and at the sectoral level. Many of these factors – such as global economic trends, technology shifts and macroeconomic and cyclical factors – affect virtually all countries. Thus it will be a mistake to treat actual economic outcomes as the potential outcomes of industrial policies, unless it is possible to correct for these common factors. In this chapter we develop a response to this problem, referred to as identifying the potential outcomes of industrial policies, by benchmarking Korea's economic performance at the sectoral level against that of comparable countries. More specifically Korea's industrial sector performance in terms of value-added and exports, at the two-digit ISIC (International Standard Industrial Classification) level, will be compared with that of selected benchmark countries over the period 1970-1996. Thus of course still leaves open the possibility that these potential outcomes are due to internal factors or policies other than industrial policies. This issue is taken up in Chapter 10.

This chapter assesses the potential outcome of industrial policies in Korea, in terms of value-added and exports and in comparison with selected benchmark countries. Section 9.2 firstly discusses the selection of benchmark countries. Then follows the evaluation of relative industrial performance, with several estimated indicators based on exports and value-added at the two-digit level in Korea compared to the benchmark countries.

9.2 Industrial Performance in Terms of Value-Added and Exports: Comparative Analysis with Selected Benchmark Countries

Comparison of performance of value-added or exports with benchmark countries, as mentioned in Chapter 4, Section 4.3, is useful since it provides (a) an insight about the relative performance of the industrial sector in Korea in terms of comparative

countries (b) a way of recognizing the effects of common external events such as favourable world demand conditions, world recessions and so forth and (c) a method to identify the implications of internal factors, including the outcome of industrial policies. In other words, since all the countries under the observation are exposed to similar external conditions, if there are differences in performances those differences could be attributed to internal factors. In that respect, if the performance of the industrial sector in Korea is relatively better than that of benchmark countries, those performance differences may be attributed to internal circumstances, including but not only the impact of industrial policies.

9.2.1. Selection of Benchmark Countries

Three criteria are relevant to the selection of benchmark countries are that, as a whole, the benchmark group provides a neutral policy base against which to assess the potential outcomes of Korean policy, that they shared common characteristics with Korea at the start of the period being studied and were exposed to similar external factors and that good, industry specific data is available for them.

Ideally, the comparison should be made with benchmark countries that had not been pursued industrial policies extensively. Such a comparison would clearly distinguish the difference in performance between those which followed policy intervention intensively and those which did not. However, this becomes impossible due to the non-availability of both policy and outcome information at the sectoral level. Under these circumstances a group of developing countries, which exhibits similar characteristics with respect to initial per capita, industrial structure and industrial composition as compared with Korea, which have had a wide range of policy regimes and for which adequate data are available, have been selected as benchmark countries. Table 9.1 illustrates the basic characteristics of the benchmark countries reviewed for this study, and countries which highlighted are finally selected.

Initially, five countries were selected as benchmark countries including Turkey, Philippines, Colombia, Paraguay and Taiwan, since these countries possess similar characteristics to the sample country in terms of GNP per capita, industrial output and industrial composition.

Table 9.1 Structural Characteristics of Benchmark Countries, 1960-70

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Country	**TO**	**Area**	**GNP**	**Pop**	**Invest**	**Pri-out**	**Indus out**	**Exp**	**Man.exp**	**Indus lab**	**Imports**	**GR**	**GRI**	**Com**
Korea	L	99	123.4	28.4	0.1483	0.4326	0.2081	0.0859	0.047	0.1328	0.1615	8.5	17.2	19
Thailand	L	514	110.4	31.0	0.2017	0.4114	0.1863	0.1827	0.033	0.0390	0.1957	8.2	11.7	19
Malaysia	SP	330	258.1	9.4	0.1593	0.4136	0.1441	0.4587	0.041	0.1199	0.4130	6.5	6.4	18
Turkey	L	781	244.3	31.1	0.1510	0.3694	0.2221	0.0617	0.004	0.0951	0.0759	6	7.8	21
Philippines	**L**	**300**	**149.3**	**31.8**	**0.2025**	**0.3329**	**0.2217**	**0.1605**	**0.013**	**0.132**	**0.1696**	**5.1**	**6.0**	**28**
Colombia	L	1139	227.9	18.0	0.1767	0.3380	0.2191	0.1142	0.007	0.1708	0.104	5.1	6.0	26
Paraguay	SP	407	200.1	2.0	0.1510	0.3683	0.1796	0.1498	0.011	0.1843	0.1577	4.3	5.5	20
Taiwan	**SM**	**36**	**201**	**12.4**	**0.2306**	**0.2784**	**0.2503**	**0.1837**	**0.087**	**0.1296**	**0.2164**	**9.2**	**16.4**	**29**
Brazil	L	8512	216.3	81.3	0.1837	0.2255	0.2202	0.0882	0.119	0.1232	0.0626	8	9.7	35
Mexico	**L**	**1973**	**434.2**	**42.7**	**0.1755**	**0.1538**	**0.2888**	**0.0972**	**0.010**	**0.2114**	**0.0980**	**7.3**	**9.3**	**29**
Sri Lanka	SP	66	141.8	11.2	0.1250	0.3411	0.1607	0.2581	0.002	0.1152	0.2539	4.6	6.7	34
Chile	**SP**	**757**	**418.7**	**8.7**	**0.1812**	**0.2091**	**0.3218**	**0.1401**	**0.018**	**0.2365**	**0.2164**	**4.2**	**5.0**	**48**
India	**L**	**3288**	**83.9**	**480.9**	**0.1781**	**0.4892**	**0.1924**	**0.0394**	**0.015**	**0.1058**	**0.0602**	**3.6**	**5.5**	**20**

Notes: * Column 2-11, data for 1965 or closest available year.

1. Trade Orientation; L (Large); SP (Small, Primary Oriented); SM (Small, Industry Oriented). 2. Area- Thousand Square Kilo Meters. 3. GNP - GNP per capita in 1964 U.S. dollars. 4. Pop - Population in millions. 5. Invest - Gross Domestic Investment as a % of GDP. 6. Pri-out - Primary output as a % of GDP. 7. Indus-out - Industry output as a % of GDP. 8. Exp - Exports as a % of GDP. 9. Man-exp - Manufacturing exports as % of GDP. 10. Indus-lab - Share of industry labour. 11. Imports - Imports as a % of GDP. 12. GR - Average annual growth rate of GDP 1960-70 (per cent). 13. GRI - Average annual growth rate of Industry 1960-70 (per cent). 14. Com - Distribution of Gross Domestic Product - Share of Industry, 1960 (per cent).

Source: Chenery and Syrquin (1975, pp. 12-13, 188-199); for columns 12-14, World Development Report (1978)

Due to the unavailability of data at the sectoral level (two-digit) for Turkey, Colombia and Paraguay, another set of countries with notable similar characteristics was chosen. Those included India, Sri Lanka, Brazil, Mexico and Chile. Of these countries, complete set of sectoral data is available only for India, Mexico, and Chile. Finally, for comparison with the industrial performance of Korea, five countries – **Taiwan, India, Philippines, Mexico and Chile** – were selected as benchmark countries. These five countries will be referred in this study as "Benchmark Countries" (BC).

9.2.2 Evaluating Industrial Performance in Terms of Value-Added and Exports

In this analysis, we assume that if internal factors, in particular industrial policies, have had any impact on industrial performance in Korea, the relative performance of value-added and exports in promoted industries in Korea will be higher than that of benchmark countries. If there is supportive evidence to justify the above assumption, then we will be able to make inferences regarding the potential outcome of policy intervention.

To investigate the above assumption in relation to industrial performance in Korea in comparison with benchmark countries, using sectoral value-added and exports, a number of measurement criteria will be estimated and applied in the following section. These measurement criteria are *(i) Value-added and exports in Korea compared to the benchmark countries, (ii) Index of Value-Added and Exports compared to the benchmark countries and (iii) Sectoral value-added as a share of GDP and sectoral exports as a share of sectoral world exports.* All these estimates will be prepared over the period 1970-1996, using data (in $US Thousands) obtained from the International Economic Databank of Australian National University, at two-digit ISIC level.

(i) Value-Added and Exports in Korea Compared to the Benchmark Countries

As an initial step of the empirical analysis, in this section, value-added and exports in Korea at the two-digit level are compared with similar values for the benchmark countries. The primary objective of this excise is to compare Korean industrial

performance with that of benchmark countries and to determine whether the relative performance of the former and the latter over the observed period 1970-1996, on an industry by industry basis. For this purpose a measure is estimated dividing the sectoral value-added (and exports) of each industrial sector in Korea, in real $US (1990=100), by the average value of that variable for the benchmark countries over the period 1970-1996.[1] If that particular measure is greater than one, it indicates that Korean value-added and exports are higher than the average level for the benchmark countries, or vice versa for values less than one. The results are presented in Table 9.2

As to be expected given Korea's overall economic growth over the period, and as can be seen from Table 9.2, industrial performance in terms of value-added was impressive in Korea as compared to the benchmark countries over the period 1970-1996, in all industries. Though only a handful of industrial sectors (Food, Wood and Non Metallic) demonstrated a similar or slightly higher level of value-added (greater than one) in 1970, all the industrial sectors in Korea achieved a ratio of over 3 by 1996. In particular, the relative growth shown by Fab. Metal, Basic Metal, Textiles and Paper sectors are quite notable. As can be seen from Table 9.2, their value-added contribution were comparatively small in 1970. However, by 1977, Fab. Metal and Textiles sectors were able to increase their value-added contribution more than double that of the benchmark countries. Gradually improving their value-added contribution over the years, these two sectors have managed to increase their value-added ratio to more than 6 times the level of the benchmark countries by 1996.

A similar evaluation as that of value-added has been carried out with respect to exports, and Table 9.3 presents the estimates in relation to exports in Korea, compared to the benchmark countries over the period 1970-1996. As can be seen from this Table, in all industrial sectors the ratio of exports in Korea to exports in the benchmark countries was relatively low, except in Wood, and Textiles Sectors, in 1970. This relatively low ratio suggests that the majority of the industries was either at the infant stage or was producing only for the domestic market, in 1970

[1] Estimation procedures are explained in Appendix 9.1.

Table 9.2 Value-Added in Korea Compared to the Benchmark Countries, 1970-1996

Period	Highly Promoted Industries*				Less Promoted Industries*			
	Fabricated Metal	Basic Metal	Chemicals	Textiles	Non Metallic	Wood	Food	Paper
1970	0.47	0.17	0.81	0.68	1.00	1.06	1.02	0.62
1971	0.43	0.19	0.94	0.76	1.09	1.33	1.00	0.72
1972	0.49	0.25	0.86	0.90	0.99	1.18	1.07	0.73
1973	0.71	0.56	0.95	1.09	1.03	1.60	0.87	0.74
1974	0.99	0.51	1.03	1.37	1.15	1.82	0.95	0.79
1975	0.95	0.62	1.31	2.08	1.34	1.76	0.98	0.94
1976	1.46	0.78	1.66	2.74	1.50	1.95	1.45	1.14
1977	2.25	1.27	1.97	2.96	2.16	3.08	1.93	1.79
1978	2.74	1.59	2.29	3.43	2.42	3.37	2.38	2.00
1979	2.43	1.58	2.24	3.00	2.72	2.22	2.03	1.87
1980	1.79	1.21	2.06	2.69	2.03	1.48	1.79	1.54
1981	1.83	1.35	2.06	2.99	1.63	1.50	1.84	1.51
1982	2.50	1.74	2.33	3.12	1.79	2.38	1.96	2.25
1983	3.12	1.85	2.23	3.26	2.27	2.39	2.35	2.83
1984	2.87	1.82	2.05	3.13	2.24	2.24	2.02	2.45
1985	2.91	1.66	1.92	3.19	2.11	2.11	1.94	2.63
1986	3.60	2.18	2.07	3.53	2.82	1.89	2.11	2.81
1987	3.94	2.30	2.18	4.03	2.79	1.86	2.23	3.14
1988	4.55	2.30	2.51	4.69	3.13	2.46	2.46	3.49
1989	4.93	2.69	2.90	4.60	3.59	2.93	2.70	3.86
1990	5.58	3.15	3.60	4.60	4.11	4.11	2.80	4.64
1991	6.06	4.48	3.30	5.98	4.88	5.67	3.11	5.06
1992	5.50	3.89	3.25	6.05	4.39	5.72	2.85	5.12
1993	6.32	3.86	3.52	6.03	4.35	6.40	2.83	6.11
1994	7.60	4.27	3.73	6.66	4.67	7.66	2.94	6.37
1995	9.98	4.98	4.47	7.73	6.56	8.51	3.44	7.36
1996	9.64	5.18	4.80	6.88	6.37	8.20	3.28	7.26

Source: Estimates based on Trade and Production data accessed through IEDB (ANU).
Note:* Data are presented according to the ranks of export promotion and growth related measures.

Highly Promoted Industries
Fabricated Metal
Basic Metal
Chemicals & Chemical Products
Textiles Wearing Apparel & Leather

Less Promoted Industries
Non Metallic Mineral
Wood & Wood Products
Food Beverages & Tobacco
Paper & Paper Products

Memorandum Item
Value-Added in Korea in Thousands $US (1990 prices)

Period	Highly Promoted Industries				Less Promoted Industries			
	Fabricated Metal	Basic Metal	Chemicals	Textiles	Non Metallic	Wood	Food	Paper
1970	7537	2235	12291	9528	3322	1981	14333	2824
1996	928962	139398	1347028	175451	93966	34325	161769	92876

Table 9.3 Exports in Korea Compared to the Benchmark Countries, 1970-1996

Period	Highly Promoted Industries*				Less Promoted Industries*			
	Fabricated Metal	Basic Metal	Chemicals	Textiles	Non Metallic	Wood	Food	Paper
1970	0.59	0.08	0.55	1.55	0.61	2.32	0.07	0.08
1971	0.65	0.17	0.73	1.70	0.84	2.92	0.09	0.20
1972	0.85	0.57	1.21	1.79	1.13	2.76	0.14	0.51
1973	1.34	0.74	1.58	2.42	1.55	2.87	0.26	2.00
1974	1.77	1.00	2.09	2.46	2.14	2.19	0.21	1.13
1975	2.02	0.74	2.44	3.26	2.65	2.77	0.42	1.50
1976	2.50	0.91	3.12	3.31	3.09	2.71	0.31	1.49
1977	2.98	1.15	3.23	3.65	3.00	2.75	0.39	1.81
1978	2.84	1.49	3.36	3.96	2.84	2.31	0.41	2.04
1979	2.72	1.81	3.26	3.59	2.64	1.80	0.35	1.42
1980	2.05	2.30	3.01	3.12	3.00	1.39	0.48	1.57
1981	2.35	3.40	2.94	3.44	3.78	1.40	0.50	1.67
1982	3.43	4.09	3.53	3.64	3.77	0.96	0.35	1.62
1983	3.31	3.02	3.39	3.37	2.12	0.57	0.38	1.23
1984	3.32	3.41	3.58	3.25	1.57	0.46	0.34	1.54
1985	3.49	3.16	3.87	3.24	1.51	0.39	0.37	1.62
1986	2.93	3.27	3.21	3.36	1.72	0.43	0.37	1.69
1987	3.33	3.23	3.31	3.56	1.62	0.48	0.45	2.10
1988	3.74	3.20	3.67	4.58	1.81	0.54	0.53	2.17
1989	3.22	3.06	3.42	3.88	1.97	0.56	0.56	2.07
1990	3.21	2.88	3.76	3.66	1.69	0.62	0.56	2.13
1991	3.07	3.29	4.03	3.26	1.51	0.51	0.47	2.00
1992	2.43	3.55	4.13	3.15	1.20	0.41	0.47	1.49
1993	2.46	3.58	3.89	3.26	1.28	0.43	0.51	1.61
1994	2.61	3.23	3.86	3.10	1.28	0.51	0.55	1.88
1995	2.78	2.48	3.83	2.78	1.27	0.55	0.49	1.80
1996	2.43	2.53	4.37	2.60	1.25	0.48	0.59	2.20

Source: Estimates based on Trade and Production data accessed through IEDB (ANU).
Note:* Data are presented according to the ranks of export promotion and growth related measures.

Highly Promoted Industries
Fabricated Metal
Basic Metal
Chemicals & Chemical Products
Textiles Wearing Apparel & Leather

Less Promoted Industries
Non Metallic Mineral
Wood & Wood Products
Food Beverages & Tobacco
Paper & Paper Products

Memorandum Item
Exports in Korea in Thousands $US (1990 prices)

Period	Highly Promoted Industries				Less Promoted Industries			
	Fabricated Metal	Basic Metal	Chemicals	Textiles	Non Metallic	Wood	Food	Paper
1970	2191	674	1382	10648	210	2989	436	42
1996	621232	64510	195864	172753	7352	4498	12747	13735

With the passage of time, Korea has been able to increase her export contribution. By 1974, almost all sectors, except the Food and Basic Metal sectors, had been able to increase their export contribution to more than that of the benchmark countries. Moreover, Korea has maintained a steady progress in terms of export contribution, especially in industrial sectors such as Fab. Metal, Basic Metal, Chemicals and Textiles. Gradually increasing their export contribution over the years, these four sectors have managed to increase their export ratio to more than double the level of the benchmark countries by 1996.

(ii) Index of Value-Added and Exports

To investigate the relative performance of value-added and exports in Korea over the period 1970-1996, taking 1970 as a base year, as a second step, the figures reported in Tables 9.2 and 9.3, have been converted into indexes. These indexes are referred to here as the Index of Value-Added and Index of Exports respectively. With these measures it is possible to examine the extent of relative industrial performance, especially the changes in individual industrial sectors in Korea as compared to the benchmark countries.

Table 9.4 shows the Index of Value-Added over the period 1970-1996. As the data in this Table indicate, almost all the industrial sectors in Korea have made a strong progress in terms of value-added over the period 1970-1996. Some cyclical fluctuations are, however, evident, especially in early 1970s and 1980s. The cyclical fluctuations in early 1970s may be attributed to the decline in investment demand, partly caused by a tight credit policy and rapid increases in prices. The resulting fall in real investment slowed Korean economy considerably during 1970-72. External factors such as the oil crisis, and a recession in advanced industrial countries also had some impact on this cyclical downturn. Likewise, numerous internal factors such as restructuring of the industrial incentive measures, restrictive monetary policy, political and social unrest following the assassination of President Park, as well as external factors including second oil price increase and recession in major industrial countries, contributed to the cyclical downturn in early 1980s.

Table 9.4 Index of Value-Added in Korea Compared to the Benchmark Countries, 1970-1996

Period	Highly Promoted Industries*				Less Promoted Industries*			
	Fabricated Metal	Basic Metal	Chemicals	Textiles	Non Metallic	Wood	Food	Paper
1970	100	100	100	100	100	100	100	100
1971	91	112	116	112	109	125	98	116
1972	104	147	106	132	99	111	105	118
1973	151	329	117	160	103	151	85	119
1974	211	300	127	201	115	172	93	127
1975	202	365	162	306	134	166	96	152
1976	311	459	205	403	150	184	142	184
1977	479	747	243	435	216	291	189	289
1978	583	935	283	504	242	318	233	323
1979	517	929	277	441	272	209	199	302
1980	381	712	254	396	203	140	175	248
1981	389	794	254	440	163	142	180	244
1982	532	1024	288	459	179	225	192	363
1983	664	1088	275	479	227	225	230	456
1984	611	1071	253	460	224	211	198	395
1985	619	976	237	469	211	199	190	424
1986	766	1282	256	519	282	178	207	453
1987	838	1353	269	593	279	175	219	506
1988	968	1353	310	690	313	232	241	563
1989	1049	1582	358	676	359	276	265	623
1990	1187	1853	444	676	411	388	275	748
1991	1289	2635	407	879	488	535	305	816
1992	1170	2288	401	890	439	540	279	826
1993	1345	2271	435	887	435	604	277	985
1994	1617	2512	460	979	467	723	288	1027
1995	2123	2929	552	1137	656	803	337	1187
1996	2051	3047	593	1012	637	774	322	1171

Source: Estimates based on Trade and Production data accessed through IEDB (ANU).
Note: * Data are presented according to the ranks of export promotion and growth related measures.

Highly Promoted Industries
Fabricated Metal
Basic Metal
Chemicals & Chemical Products
Textiles Wearing Apparel & Leather

Less Promoted Industries
Non Metallic Mineral
Wood & Wood Products
Food Beverages & Tobacco
Paper & Paper Products

Memorandum Item
Value-Added in Korea Compared to the Benchmark Countries

Period	Highly Promoted Industries				Less Promoted Industries			
	Fabricated Metal38	Basic Metal	Chemicals	Textiles	Non Metallic	Wood	Food	Paper
1970	0.47	0.17	0.81	0.68	1.00	1.06	1.02	0.62
1996	9.64	5.18	4.80	6.88	6.37	8.20	3.28	7.26

Table 9.5 Index of Exports in Korea Compared to the Benchmark Countries, 1970-1996

Period	Highly Promoted Industries*				Less Promoted Industries*			
	Fabricated Metal	Basic Metal	Chemicals	Textiles	Non Metallic	Wood	Food	Paper
1970	100	100	100	100	100	100	100	100
1971	110	213	133	110	138	126	129	250
1972	144	713	220	115	185	119	200	638
1973	227	925	287	156	254	124	371	2500
1974	300	1250	380	159	351	94	300	1413
1975	342	925	444	210	434	119	600	1875
1976	424	1138	567	214	507	117	443	1863
1977	505	1438	587	235	492	119	557	2263
1978	481	1863	611	255	466	100	586	2550
1979	461	2263	593	232	433	78	500	1775
1980	347	2875	547	201	492	60	686	1963
1981	398	4250	535	222	620	60	714	2088
1982	581	5113	642	235	618	41	500	2025
1983	561	3775	616	217	348	25	543	1538
1984	563	4263	651	210	257	20	486	1925
1985	592	3950	704	209	248	17	529	2025
1986	497	4088	584	217	282	19	529	2113
1987	564	4038	602	230	266	21	643	2625
1988	634	4000	667	295	297	23	757	2713
1989	546	3825	622	250	323	24	800	2588
1990	544	3600	684	236	277	27	800	2663
1991	520	4113	733	210	248	22	671	2500
1992	412	4438	751	203	197	18	671	1863
1993	417	4475	707	210	210	19	729	2013
1994	442	4038	702	200	210	22	786	2350
1995	471	3100	696	179	208	24	700	2250
1996	412	3163	795	168	205	21	843	2750

Source: Estimates based on Trade and Production Data accessed through IEDB (ANU).
Note: * Data are presented according to the ranks of export promotion and growth related measures

Highly Promoted Industries
Fabricated Metal
Basic Metal
Chemicals & Chemical Products
Textiles Wearing Apparel & Leather

Less Promoted Industries
Non Metallic Mineral
Wood & Wood Products
Food Beverages & Tobacco
Paper & Paper Product

Memorandum Item
Exports in Korea Compared to the Benchmark Countries

Period	Highly Promoted Industries				Less Promoted Industries			
	Fabricated Metal	Basic Metal	Chemicals	Textiles	Non Metallic	Wood	Food	Paper
1970	0.59	0.08	0.55	1.55	0.61	2.32	0.07	0.08
1996	2.43	2.53	4.37	2.60	1.25	0.48	0.59	2.20

Despite these cyclical changes, the data presented in Table 9.4 clearly indicate a number of important features. Firstly, during the period 1973-78, and also after 1985, almost all the industrial sectors achieved a strong progress in terms of value-added. Secondly, the performance of four industrial sectors in Korea is more prominent than that of the other four, as compared to the benchmark countries. These industrial sectors namely Basic Metal, Fab. Metal, Paper and Textiles have recorded nearly 30, 20, 11 and 10 fold increases compared to the benchmark countries over the period 1970-1996.

Similar estimates as that of value-added, but with respect to exports are presented in Table 9.5. This Table demonstrates the Index of Exports in Korea compared to the benchmark countries over the period 1970-1996. As can be seen from the Table 9.5, all industrial sectors, except Wood in Korea have achieved a satisfactory progress in terms of exports, compared to the benchmark countries over the observed period. Cyclical fluctuations in exports are more frequent among industrial sectors and vary from one industrial sector to the other except the common cyclical downturn experienced in the late 1970s. A series of internal as well as external factors that have been specified earlier in relation to the slow down of performance of value-added, might also have affected unfavourably for export performances in late 1970s.

In addition to the cyclical fluctuations noted above, data presented in Table 9.5 reveal a number of interesting points. Firstly, like in the case of value-added, during the period between 1972-78, all the industrial sectors except Wood have shown a steady progress in terms of exports. Secondly, the export performance of Basic Metal and Paper are relatively higher than other sectors in Korea compared to the benchmark countries. Strikingly higher performance in these two sectors is largely due to Korea's ability to increase the share in exports an increasing rate than that of benchmark countries. Thirdly, export performance of several industrial sectors including Textiles, Wood and Non Metallic, are not only relatively low in Korea but also have dramatically decreased compared to the benchmark countries.

(iii) Sectoral Value-Added as a Share of GDP and Sectoral Exports as a Share of Sectoral World Exports

The empirical analyses outlined in the previous sections provide useful insights about industrial performances. However, those indicators may have limitations when they are used for comparison purposes. Because internal relative prices, changing relative prices over time, foreign exchange regimes and rates etc. may exert significant influence on those indicators. To examine the contribution of an industrial sector in the context of the overall economy, as a third step, therefore another measure will be applied in this section. This measure – sectoral value-added as a share GDP in Korea (per cent) – for the benchmark countries and for Korea during the period 1970-1996 respectively are presented in Table 9.6. As the data in this table and respective graphs (Charts 9.1a and 9.1b) demonstrate value-added as a share of GDP in almost all the industrial sectors are higher in Korea than that of the benchmark countries. This in turn suggests that the relative importance of industrial sector in the economy of Korea than that of the benchmark countries. One can question the comparison of value-added as a share of GDP in Korea compared to the benchmark countries, saying that Korea is a relatively small country and its Gross Domestic Product largely consists of industrial production. However, as noted earlier, and as can be seen from Table 9.1 which demonstrates the structural characteristics of the benchmark countries, at the initial stage Korea either remained far behind or demonstrated similar levels as regards to many of the relevant characteristics for example industrial output, share of industry in Gross Domestic Product etc. In that respect, the superior performance of value-added in Korea could be considered as a significant achievement.

The data appear in Table 9.6 and respective graphs reveal several changes which vary from industry to industry. For instance, in sectors like Food and Textiles, sectoral value-added as a share of GDP is although comparatively higher in initial years, their relative contribution is gradually decreasing since the latter half of 1980s. Nevertheless, rest of the sectors has shown a gradual improvement of their share of value-added in GDP. The value-added contribution in sectors like Fab. Metal, Basic Metal and Chemicals are prominent than that of others. Overall these changes suggest that Korea is gradually transforming its industrial structure from light, low value-added industries towards high value-added and technology intensive industries.

Further, though the benchmark countries are also consolidating their position and gradually improving their value-added contribution, Korea is still in the lead in its value-added contribution in most of the sectors, in particular in Fab. Metal and Chemicals.

Similarly, to evaluate the export performances further, we will apply another measure – sectoral exports as a share of sectoral world exports – for the benchmark countries as well as for Korea, for the period 1970-1996 respectively, and these data are presented in Table 9.7. With this measure it is also possible to examine whether Korea has been able to increase her market share over the time. As the data in Table 9.7 and respective graphs (Chart 9.2 (a) and (b)) illustrate, Korea has been able to increase her market share in almost all the industrial exports except Food and Wood sectors. In particular, sectoral exports as a share of sectoral world exports are more notable in sectors such as Fab. Metal, Basic Metal, Chemicals and Textiles compared to the benchmark countries. Another interesting characteristic is that all these sectors in which have gained comparatively higher performance, except the Textiles had export performances well below the benchmark countries in 1970. Starting from 1973, however all these sectors began to outperform than that of the benchmark countries.

As it is clear from the above analyses, almost all the performance indicators of value-added and exports applied, indicate relatively superior performance for Korea compared to the benchmark countries. With these results it is possible to conclude that internal factors, possibly industrial policies might have contributed to the successful performance in Korea. Since favourable industrial performance may be a result of a combination of several factors, to decide whether industrial policies in fact play any decisive role, however, more explicit analyses are required. Owing to the data constraints though this latter task has become difficult, to be able to make inferences, further empirical investigations will be carried out in the next chapter using the estimates reported in step 3, since these estimates may provide valuable insights regarding the impact of industrial policies than that of the estimates reported in step 1 and step 2.

9.3 Conclusion

This chapter has examined the performance of each industrial sector at two-digit level by applying various measurement indicators of value-added and exports in comparison to a number of selected benchmark countries. Since all the countries under the observation face similar external conditions, we assume that if there are performance differences between Korea and benchmark countries those differences could be attributed to the internal factors.

The empirical results included in this chapter reveal a number of important points. Firstly, as it is evident, all the six major indicators we applied for examining relative industrial performance (Value-added and exports as compared to the benchmark countries, Index of Value-Added, Index of Exports, Sectoral value-added as a share of GDP, and Sectoral exports as share of sectoral world exports) reveal that Korea has recorded relatively higher performance in the majority of industrial sectors than that of the benchmark countries. Secondly, when all these evidences are taken together it is possible to conclude that comparatively higher industrial performance of Korea might have been achieved through the process of effective management of internal factors.

These empirical results further suggest that industrial performances are more often susceptible to both internal and external changes. Therefore, a caution is required for interpreting the performances of value-added and exports as a policy outcome. In fact, more explicit empirical investigations are required to ascertain whether these strong industrial performances could be attributed to deliberate government intervention efforts or industrial policies. Subject to limitation of data, this latter task will be carrying out in the next chapter using the estimates presented in step 3 of this chapter since those data would provide more valuable insights gauging the impact of industrial policies.

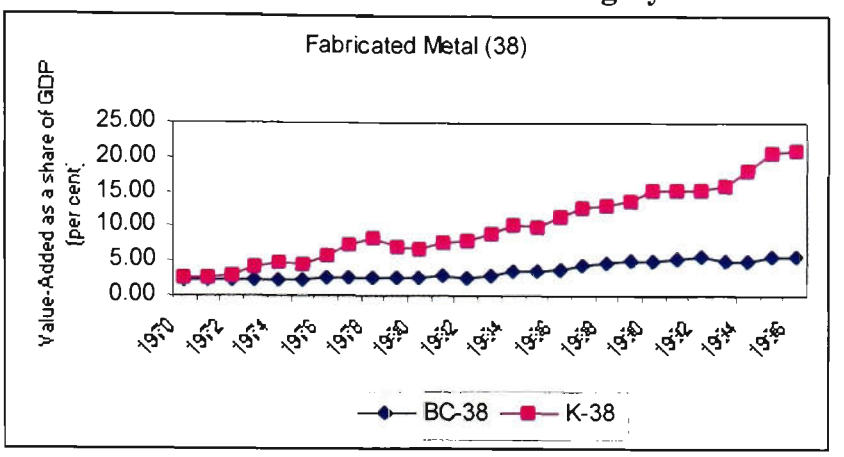
Table 9.6 Sectoral Value-Added as a Share of GDP (per cent)

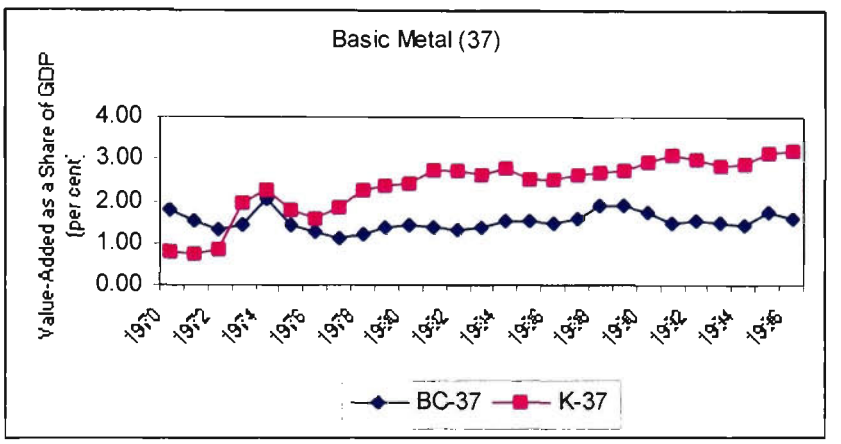
	Highly Promoted Industries								Less Promoted Industries							
Period	BC-38	K-38	BC-37	K-37	BC-35	K-35	BC-32	K-32	BC-36	K-36	BC-33	K-33	BC-31	K-31	BC-34	K-34
1970	2.19	2.65	1.79	0.78	2.08	4.32	1.92	3.35	0.46	1.17	0.26	0.70	1.94	5.03	0.62	0.99
1971	2.17	2.39	1.53	0.73	1.97	4.73	1.81	3.52	0.43	1.21	0.27	0.92	1.92	4.96	0.61	1.13
1972	2.11	2.72	1.28	0.83	1.99	4.45	1.86	4.39	0.43	1.12	0.30	0.91	1.91	5.32	0.56	1.07
1973	2.34	4.09	1.40	1.91	2.18	5.04	2.06	5.51	0.52	1.29	0.30	1.16	2.15	4.59	0.61	1.11
1974	2.23	4.76	2.02	2.22	2.22	4.93	1.71	5.05	0.53	1.32	0.22	0.87	2.37	4.83	0.65	1.11
1975	2.30	4.48	1.38	1.75	2.23	6.00	1.43	6.07	0.56	1.53	0.20	0.72	2.39	4.78	0.56	1.08
1976	2.50	5.79	1.27	1.57	2.30	6.03	1.51	6.57	0.58	1.39	0.23	0.73	2.37	5.43	0.59	1.06
1977	2.45	7.32	1.08	1.82	2.19	5.72	1.55	6.11	0.57	1.63	0.19	0.77	2.32	5.96	0.54	1.30
1978	2.57	8.15	1.21	2.23	2.23	5.89	1.70	6.73	0.60	1.67	0.24	0.93	2.20	6.05	0.59	1.36
1979	2.67	7.11	1.35	2.34	2.29	5.60	1.76	5.77	0.57	1.70	0.29	0.70	2.19	4.87	0.62	1.28
1980	2.64	6.69	1.39	2.39	2.14	6.28	1.57	5.98	0.61	1.77	0.25	0.53	2.00	5.09	0.62	1.36
1981	2.77	7.48	1.35	2.69	2.10	6.38	1.43	6.33	0.66	1.59	0.22	0.48	1.86	5.04	0.60	1.33
1982	2.68	7.92	1.31	2.68	2.17	5.97	1.51	5.58	0.64	1.35	0.21	0.60	2.25	5.20	0.51	1.37
1983	2.74	8.85	1.36	2.61	2.58	5.96	1.59	5.37	0.67	1.58	0.23	0.58	2.09	5.10	0.54	1.58
1984	3.49	10.10	1.50	2.74	2.98	6.16	1.79	5.65	0.73	1.64	0.24	0.54	2.40	4.88	0.63	1.57
1985	3.39	9.96	1.51	2.52	3.11	6.03	1.67	5.37	0.73	1.57	0.23	0.49	2.30	4.51	0.56	1.50
1986	3.92	11.26	1.43	2.49	3.64	6.02	2.04	5.72	0.72	1.62	0.31	0.47	2.60	4.37	0.70	1.56
1987	4.49	12.53	1.58	2.58	4.06	6.27	2.08	5.94	0.79	1.56	0.37	0.49	2.68	4.24	0.75	1.65
1988	4.71	13.03	1.88	2.63	4.16	6.35	1.96	5.57	0.83	1.57	0.38	0.56	2.75	4.12	0.77	1.63
1989	5.04	13.56	1.85	2.71	4.04	6.39	2.06	5.17	0.87	1.71	0.39	0.62	2.86	4.21	0.81	1.71
1990	5.10	15.22	1.73	2.91	3.74	7.21	1.92	4.72	0.89	1.96	0.33	0.73	2.82	4.23	0.74	1.83
1991	5.36	15.30	1.46	3.09	4.14	6.44	1.84	5.18	0.99	2.28	0.34	0.92	2.90	4.25	0.75	1.80
1992	5.56	15.10	1.53	2.94	4.28	6.86	1.78	5.30	1.00	2.17	0.31	0.88	3.01	4.23	0.75	1.90
1993	5.09	15.92	1.46	2.78	4.00	6.97	1.73	5.18	1.00	2.15	0.28	0.89	2.93	4.10	0.68	2.07
1994	4.92	17.89	1.41	2.88	3.99	7.14	1.52	4.84	0.92	2.05	0.25	0.90	2.83	3.99	0.70	2.13
1995	5.56	20.46	1.69	3.10	4.61	7.60	1.61	4.60	0.88	2.14	0.27	0.84	3.01	3.83	0.80	2.18
1996	5.58	21.04	1.56	3.16	4.18	7.86	1.48	3.97	0.85	2.13	0.24	0.78	2.85	3.66	0.74	2.10

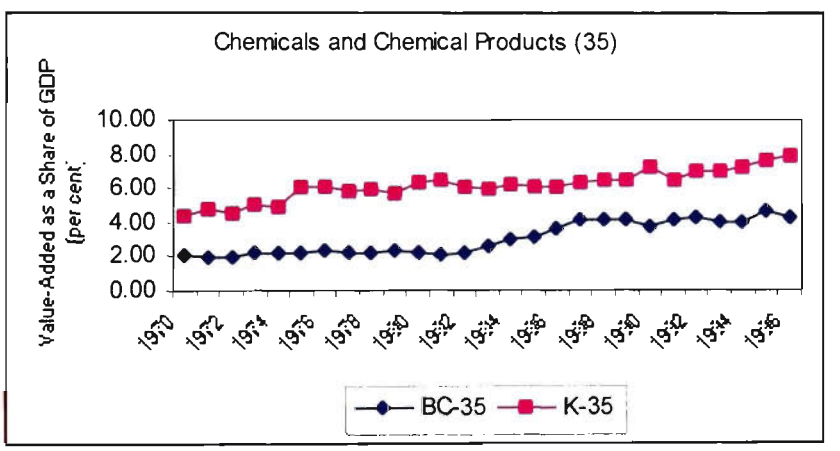
Note: BC- Benchmark countries K- Korea

.Source: Estimates based on Trade and Production data accessed through IEDB and World Bank at ANU.

Chart 9.1a Value-Added as a Share of GDP in Highly Promoted Industries







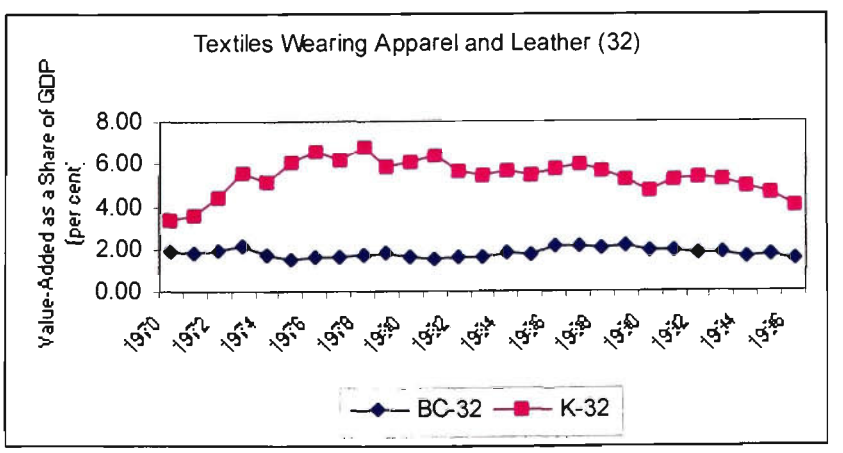
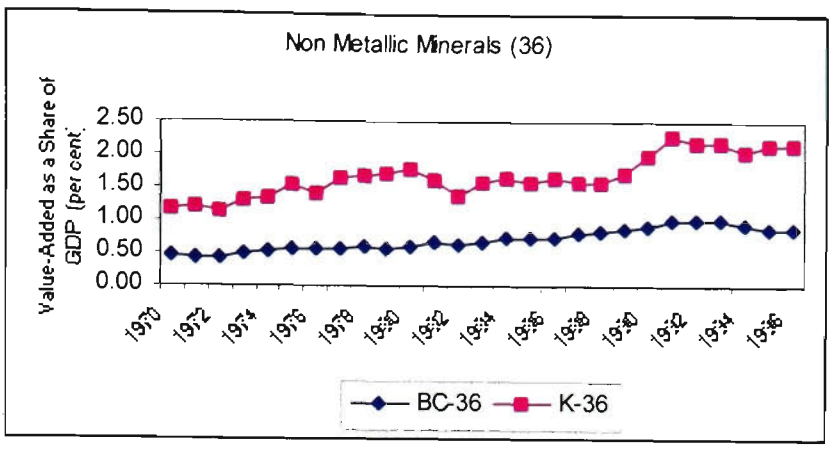
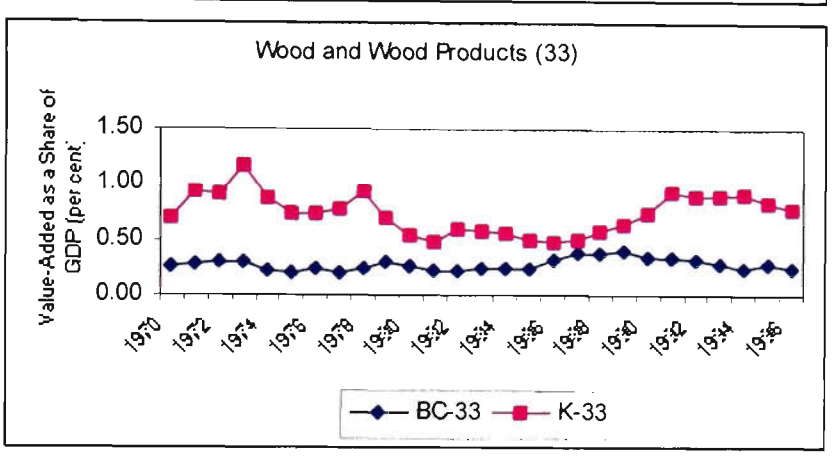
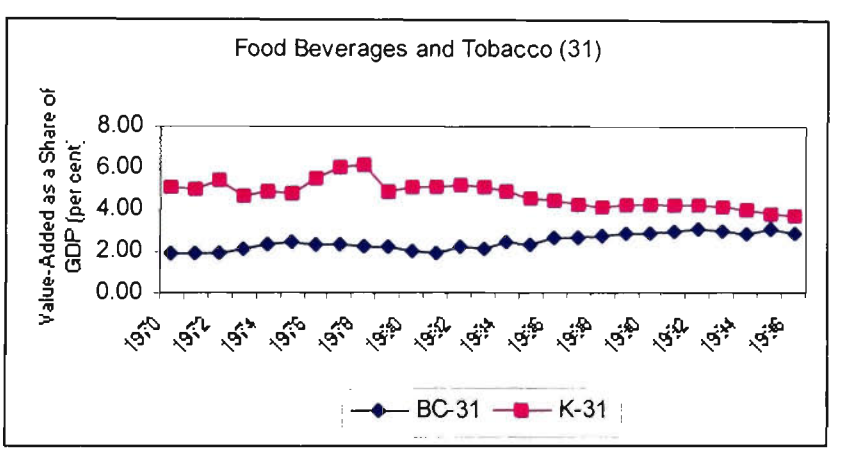


Chart 9.1b Value-Added as a Share of GDP in Less Promoted Industries







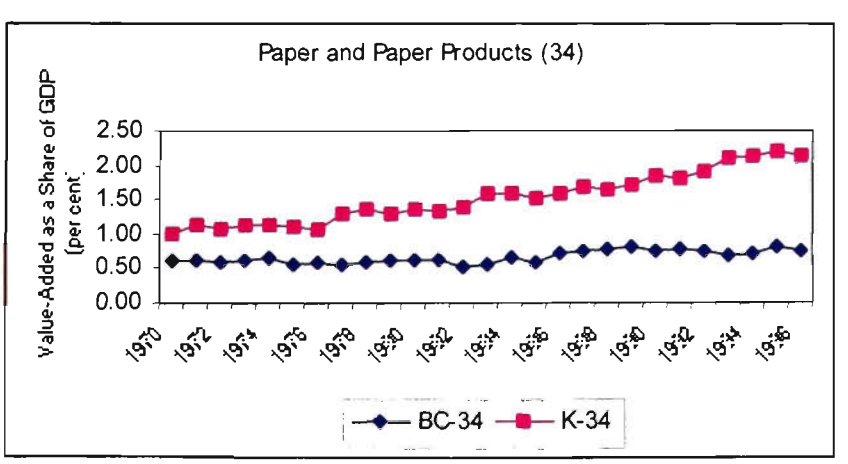
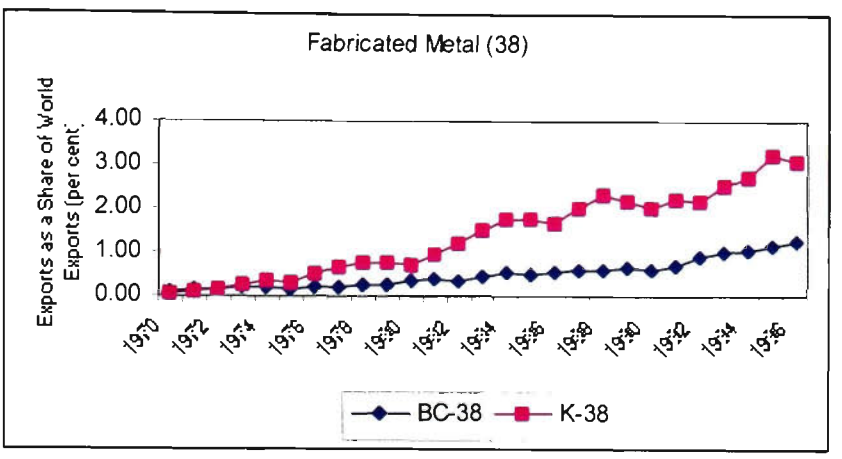


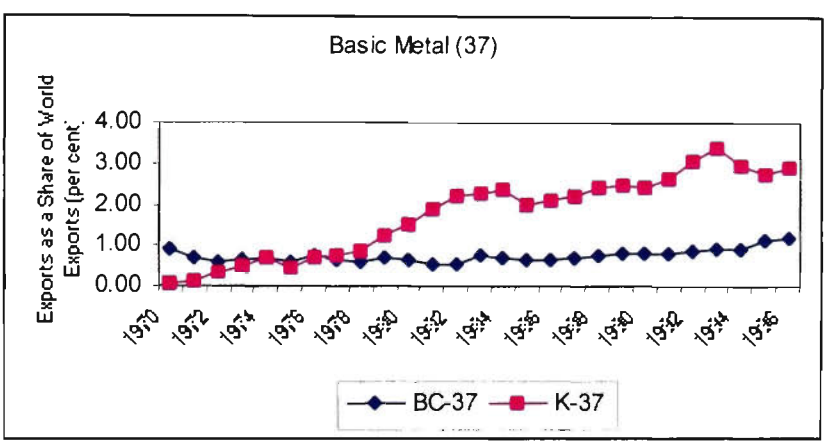
Table 9.7 Sectoral Exports as a Share of Sectoral World Exports (per cent)

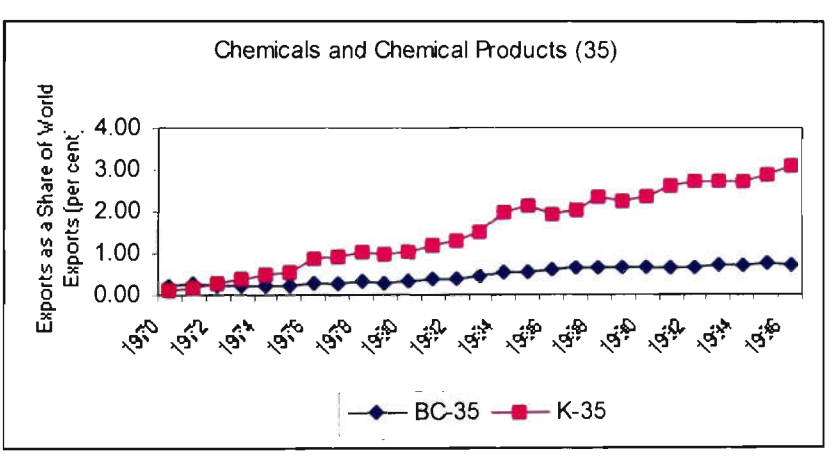
	Highly Promoted Industries								Less Promoted Industries							
Period	BC-38	K-38	BC-37	K-37	BC-35	K-35	BC-32	K-32	BC-36	K-36	BC-33	K-33	BC-31	K-31	BC-34	K-34
1970	0.12	0.07	0.91	0.07	0.22	0.12	1.00	1.55	0.28	0.17	0.76	1.77	0.69	0.05	0.17	0.01
1971	0.13	0.09	0.68	0.11	0.24	0.17	1.13	1.93	0.36	0.30	0.74	2.17	0.69	0.06	0.16	0.03
1972	0.17	0.14	0.57	0.32	0.23	0.28	1.22	2.19	0.37	0.42	0.82	2.26	0.67	0.09	0.17	0.09
1973	0.21	0.27	0.62	0.46	0.23	0.37	1.27	3.08	0.41	0.63	0.98	2.83	0.70	0.18	0.18	0.37
1974	0.20	0.35	0.70	0.70	0.22	0.47	1.29	3.17	0.42	0.90	0.80	1.76	0.97	0.21	0.20	0.22
1975	0.16	0.31	0.59	0.43	0.21	0.52	1.17	3.83	0.39	1.04	0.75	2.07	0.88	0.37	0.19	0.29
1976	0.20	0.50	0.77	0.69	0.26	0.82	1.47	4.85	0.51	1.59	0.95	2.58	0.83	0.25	0.23	0.34
1977	0.22	0.65	0.63	0.73	0.28	0.89	1.36	4.96	0.64	1.91	0.96	2.64	0.78	0.30	0.24	0.43
1978	0.26	0.73	0.59	0.87	0.30	1.02	1.37	5.41	0.57	1.61	1.09	2.52	0.70	0.28	0.27	0.54
1979	0.27	0.73	0.67	1.21	0.29	0.93	1.36	4.88	0.51	1.34	1.24	2.23	0.74	0.26	0.27	0.39
1980	0.35	0.72	0.65	1.50	0.33	0.99	1.53	4.77	0.59	1.77	1.18	1.65	0.73	0.35	0.28	0.45
1981	0.40	0.95	0.56	1.89	0.39	1.16	1.70	5.87	0.66	2.50	1.31	1.83	0.72	0.36	0.31	0.52
1982	0.34	1.13	0.54	2.20	0.36	1.27	1.64	5.98	0.67	2.54	1.21	1.16	0.72	0.25	0.29	0.47
1983	0.46	1.52	0.75	2.26	0.44	1.49	1.79	6.04	0.90	1.91	1.42	0.82	0.73	0.28	0.42	0.52
1984	0.53	1.75	0.68	2.32	0.54	1.93	1.92	6.25	1.04	1.63	1.46	0.66	0.71	0.24	0.37	0.57
1985	0.50	1.75	0.63	1.99	0.55	2.12	1.85	5.99	1.03	1.56	1.29	0.50	0.68	0.25	0.34	0.56
1986	0.56	1.63	0.63	2.07	0.59	1.89	1.78	5.98	0.99	1.70	1.31	0.56	0.70	0.26	0.41	0.70
1987	0.59	1.98	0.69	2.21	0.61	2.01	1.86	6.63	1.16	1.88	1.44	0.69	0.69	0.31	0.39	0.81
1988	0.62	2.32	0.75	2.41	0.62	2.29	1.75	8.02	1.10	2.00	1.32	0.72	0.66	0.35	0.39	0.85
1989	0.67	2.15	0.80	2.45	0.65	2.21	1.85	7.15	1.05	2.07	1.22	0.68	0.64	0.36	0.38	0.78
1990	0.62	1.98	0.83	2.38	0.61	2.30	1.67	6.12	0.85	1.45	0.94	0.58	0.57	0.32	0.34	0.72
1991	0.71	2.20	0.79	2.61	0.64	2.60	1.87	6.09	0.91	1.37	1.05	0.53	0.64	0.30	0.35	0.71
1992	0.89	2.17	0.86	3.06	0.65	2.69	1.80	5.66	0.98	1.18	1.09	0.45	0.65	0.30	0.48	0.72
1993	1.02	2.50	0.93	3.33	0.70	2.70	1.80	5.88	1.05	1.34	1.10	0.47	0.67	0.34	0.51	0.82
1994	1.03	2.68	0.90	2.92	0.70	2.69	1.82	5.65	0.96	1.23	1.02	0.51	0.64	0.35	0.50	0.95
1995	1.15	3.20	1.10	2.73	0.74	2.85	1.93	5.37	0.91	1.15	0.97	0.53	0.80	0.39	0.54	0.98
1996	1.26	3.07	1.15	2.90	0.70	3.06	2.01	5.22	0.94	1.17	1.04	0.50	0.76	0.45	0.52	1.14

Note: BC- Benchmark Countries K- Korea.
Source: Estimates based on Trade and Production data accessed through IEDB (ANU).

Chart 9.2a Exports as a Share of Sectoral World Exports in Highly Promoted Industries







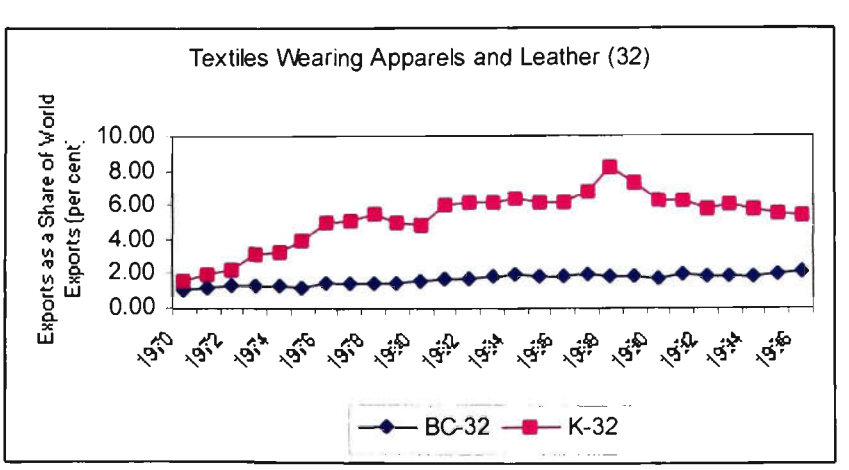
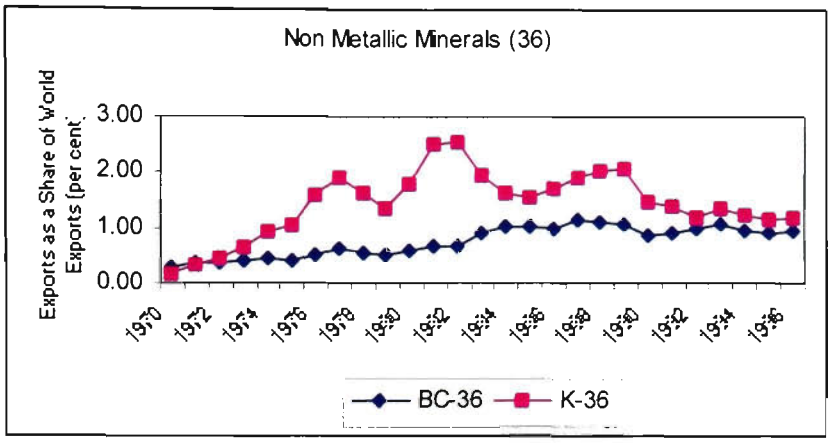
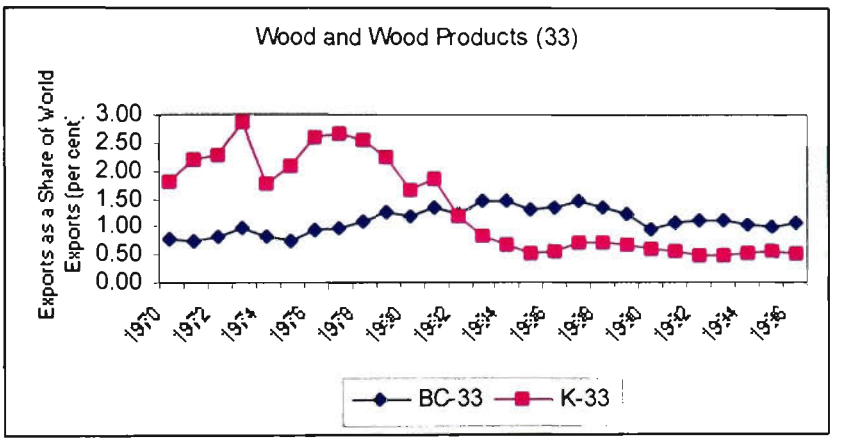
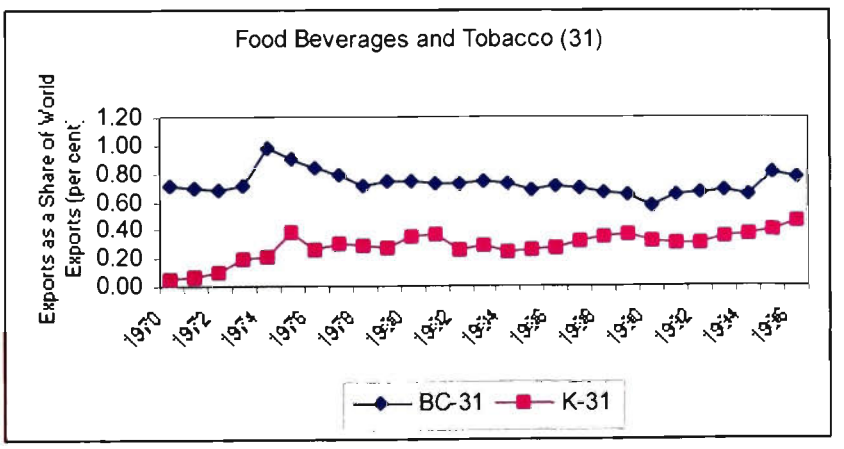
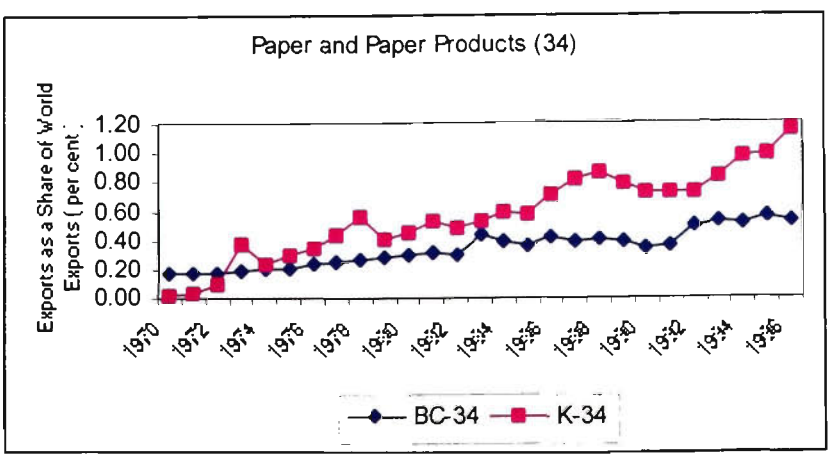


Chart 9.2b Exports as a Share of Sectoral World Exports in Less Promoted Industries









Appendix 9.1 Estimation Procedures Adopted for Performance Variables

Estimation of value-added and exports as compared to the benchmark countries

Value-added and exports data at two-digit ISIC level for Korea as well as benchmark countries were obtained from the Australian National University (International Economic Data Bank), over the period 1970-1996. These data are available in thousand US dollars. To obtain real values these data are deflated using producer price index in U.S.A (1990 prices) since it was unable to find producer price indexes or another suitable indicator for benchmark countries.

To estimate the value-added figures appearing in Table 9.2, first of all real value-added of the five benchmark countries were added together for each year at the two-digit level, and the average value-added for benchmark countries for each industry is estimated. Next, to obtain the estimates appearing in Table 9.2, real value-added for each year at the two-digit level in Korea was divided by the corresponding values for the benchmark countries. The estimates appearing in Table 9.3 are also obtained by following a similar process.

The data appearing in Table 9.6 are estimated by dividing sectoral real value-added by real total Gross Domestic Product values for Korea and benchmark countries. Since total value-added data at sectoral level was not available, total Gross Domestic Product value data obtained from the World Bank Data Tables of Australian National University is applied for these estimates.

Data appearing in Table 9.7 are estimated dividing sectoral real exports by sectoral real world exports.

10. The Effectiveness of Industrial Policy: An Initial Application of the Framework

10.1 Introduction

The empirical analyses included in Chapter 9 revealed that industrial sector performance, in terms of both value-added and exports, was generally stronger in Korea than in the benchmark countries. To what extent can this impressive performance be attributed to government intervention, or more specifically, to the industrial policies in place during the period under study? To be able to answer this question, more explicit analyses, such as an evaluation of the association between industrial performance and measures of the incidence of industrial policy, are required.

Owing to the limited data on incidence measures, however, it is difficult to carry out such an explicit analysis. Nevertheless, as a third step in the empirical assessment, three alternative empirical tests will be applied in this chapter to investigate whether it may be possible to attribute superior industrial performance in Korea to government intervention. Firstly, the aggregate performance of highly promoted groups, both those that are based on export promotion and growth related measures and those based on import substitution related measures, will be compared with that of less promoted groups and also with outcomes in the benchmark countries. This will be helpful for the purpose of investigating whether there are systematic differences in performances between the two groups. Secondly, this study will examine the industrial performance of various groups of industries in Korea, relative to that of benchmark countries, with special regard to differences between the periods before and after 1982, the year in which the strongly interventionist policies began to be dismantled. The purpose of this exercise is to examine whether the performance in the high intervention period in Korea differs significantly from that of the subsequent period. Thirdly, the relationship between incidence measures and relative industrial performance will be examined, in a very preliminary way, using a regression analysis with panel data.

These three alternative tests will be used to investigate whether inferences can be made regarding the effectiveness of industrial policies. More specifically, we consider that if government intervention, especially industry specific intervention, has had any impact on industrial performances in Korea, then:

(a) highly promoted industries will show positively higher performance than similar industries in benchmark countries, and also than less promoted industries within Korea;

(b) industrial performances in Korea in general, and that of the highly promoted groups in particular, will be better relative to that of benchmark countries during the high intervention period, but this relative performance will be less marked after the scaling down of intervention; and

(c) there should be a positive and a statistically significant relationship between incidence measures and relative industrial performance measures over the policy intervention period.

The empirical evidence on the above three statements may be used for deriving inferences regarding the effectiveness of government intervention, in particular of industry specific intervention. However, it is important to note that these empirical tests have their own limitations, and therefore any inferences must be made subject to qualifications. For example, for the first empirical test included in this chapter, we will apply the classification of industries as highly promoted and less promoted groups on the basis of the limited data on incidence measures available for Korea. These industry groups are compared with similar groups of industries in the benchmark countries. The benchmark countries are chosen as countries similar to Korea at the start of the period, and as on balance a policy neutral base. These assumptions may be inaccurate in various possible ways. Similarly, the second empirical test included in this chapter will compare the performance between Korea and benchmark countries between policy periods. As far as the incidence of industrial policies is concerned, though the base years selected for the comparison may be suitable for Korea in many ways, these base years may not reflect continued policy neutrality in the benchmark countries. Lags in the effects of policy are

also often long and uncertain, so again the choice of years may misrepresent the impact of policy. The third empirical test – a regression analysis with panel data – also has severe limitations, mainly due to the quality of data available for this study. Therefore, given limited data and with other limitations in the techniques applied, any inferences made through these empirical tests must be subject to heavy qualifications.

In this context, a central purpose of this chapter is to explore the viability of the overall approach to the assessment of the effectiveness of industry policy. Even if the limitations of the data currently available preclude firm conclusions about the substantive topic, this analysis may indicate whether the framework used is sufficiently promising to be worthy of a detailed analysis with access to better data sources.

This chapter is organized as follows. Section 10.2 will analyse the performance differences between highly promoted groups and less promoted groups, on the basis of export promotion and growth related measures and also of import substitution related measures, for both Korea and the benchmark countries. Then Section 10.3 will examine whether there are apparent differences in industrial performance in Korea during the high intervention period and the period after 1982, again in comparison to the benchmark countries. The final section of this chapter (Section 10.4) will explore the association between incidence measures and relative industrial performances using panel regression.

10.2 Differential Performance of Industry Groups by Policy Stance

As outlined previously, the industrial performance analyses included in Chapter 9 demonstrate that, both in terms of value-added and exports, the Korean performance was relatively better than that of benchmark countries over the period 1970-96. To ascertain whether there is any association between these results and policy factors, more specifically government intervention, in this section we will examine the performance differences between highly promoted groups and less promoted groups in Korea and the benchmark countries. The underlying assumption when carrying out this comparison is

that a necessary condition for policy being effective is that the highly promoted group should have a relatively higher performance than that of the less promoted group.

10.2.1 Differential Performance of Industry Groups Based on Export Promotion and Growth Related Measures

For the present investigation we will use aggregate value-added and export data for the two categories – the highly promoted (HP) group and the less promoted (LP) group – based on the industry ranks of export promotion and growth policy measures (Table 8.7). Accordingly, the highly promoted group will include four industrial sectors (Fabricated Metals, Basic Metals, Chemicals, and Textiles) and the less promoted group will include the other four industrial sectors (Non Metallic Minerals, Wood, Food, and Paper).

As discussed in Chapter 9, the most convenient form of outcome comparison with the benchmark countries for these measures is relative industry value-added as a share of GDP and relative industry exports as a share of world exports. Table 10.1 and Charts 10.1 to 10.8 provide the aggregated data for industry value-added shares, and for industry shares of world exports, for Korea and the benchmark countries. The data are provided for the two groups of industries, are expressed in index form, using 1970 (=100) as the base year, and cover the period 1970-1996. These estimates reveal a number of important characteristics.

Firstly, as clearly demonstrated by the data in Table 10.1 (columns 2 and 3) and Chart 10.1, the performance of value-added in the highly promoted group in Korea is much better than that of the same group in benchmark countries during the period 1970-1996. By 1996 the relevant index for Korea had reached 325 (the value-added share of GDP for the highly promoted groups was 225 per cent higher than in 1970), the index value for the benchmark countries was only 160. The data also illustrate that value-added as a share of GDP in this particular group in Korea grew especially rapidly relative to the benchmark countries until early 1980s. Indeed, by 1982 the value-added share of GDP in

Table 10.1 Differential Performance of Industry Groups, by Policy Stance in Korea and Benchmark Countries, 1970-1996

Period	Export Promotion and Growth Related Measures							
	Value-Added as a Share of GDP (1970=100)				Exports as a Share of World Exports (1970=100)			
	HP-BC	HP-K	LP-BC	LP-K	HP-BC	HP-K	LP-BC	LP-K
1970	100	100	100	100	100	100	100	100
1971	94	103	99	104	97	126	102	128
1972	91	112	98	107	98	162	106	143
1973	100	149	109	103	104	230	119	200
1974	102	153	115	103	107	258	125	154
1975	92	165	113	103	95	280	116	188
1976	95	180	115	109	120	378	132	237
1977	91	189	110	122	111	397	137	263
1978	97	207	111	127	112	442	138	247
1979	101	188	112	108	115	426	145	210
1980	97	192	107	111	127	439	146	210
1981	96	206	102	107	136	542	157	260
1982	96	200	110	108	128	585	152	221
1983	104	205	108	112	153	623	182	176
1984	122	222	122	110	163	673	188	155
1985	121	215	117	102	157	652	175	143
1986	138	230	132	102	158	636	179	160
1987	153	246	140	101	167	706	193	185
1988	159	249	144	100	167	827	182	195
1989	163	251	151	105	176	768	172	194
1990	157	271	146	111	166	703	141	153
1991	160	271	152	117	179	742	155	145
1992	165	272	155	116	187	747	168	132
1993	154	278	149	117	198	793	175	148
1994	148	295	143	115	198	767	164	152
1995	169	322	152	114	219	778	169	152
1996	160	325	143	110	228	784	171	163

Source: Estimates based on Trade and Production data accessed through IEDB (ANU).

Notes: HP-BC – Highly Promoted group in benchmark countries
HP-K – Highly Promoted group in Korea
LP-BC – Less Promoted group in benchmark countries
LP-K – Less Promoted group in Korea

Chart 10.1

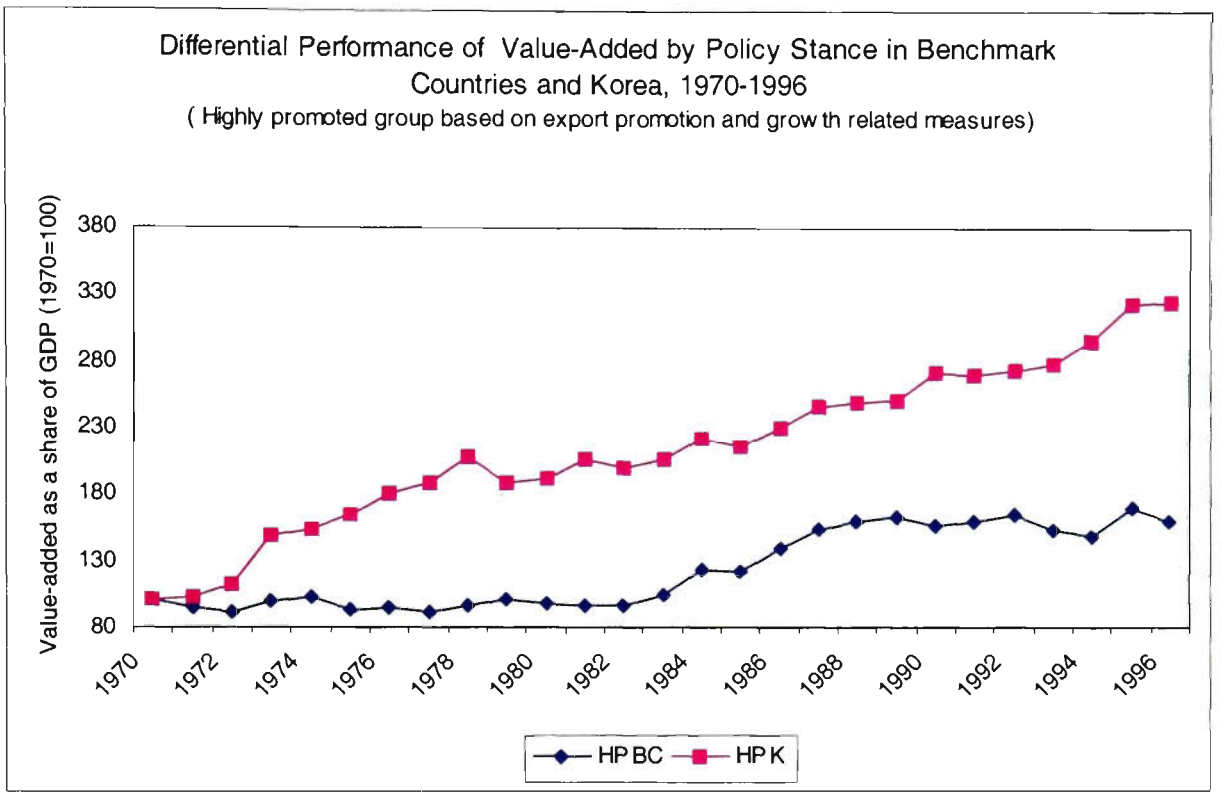
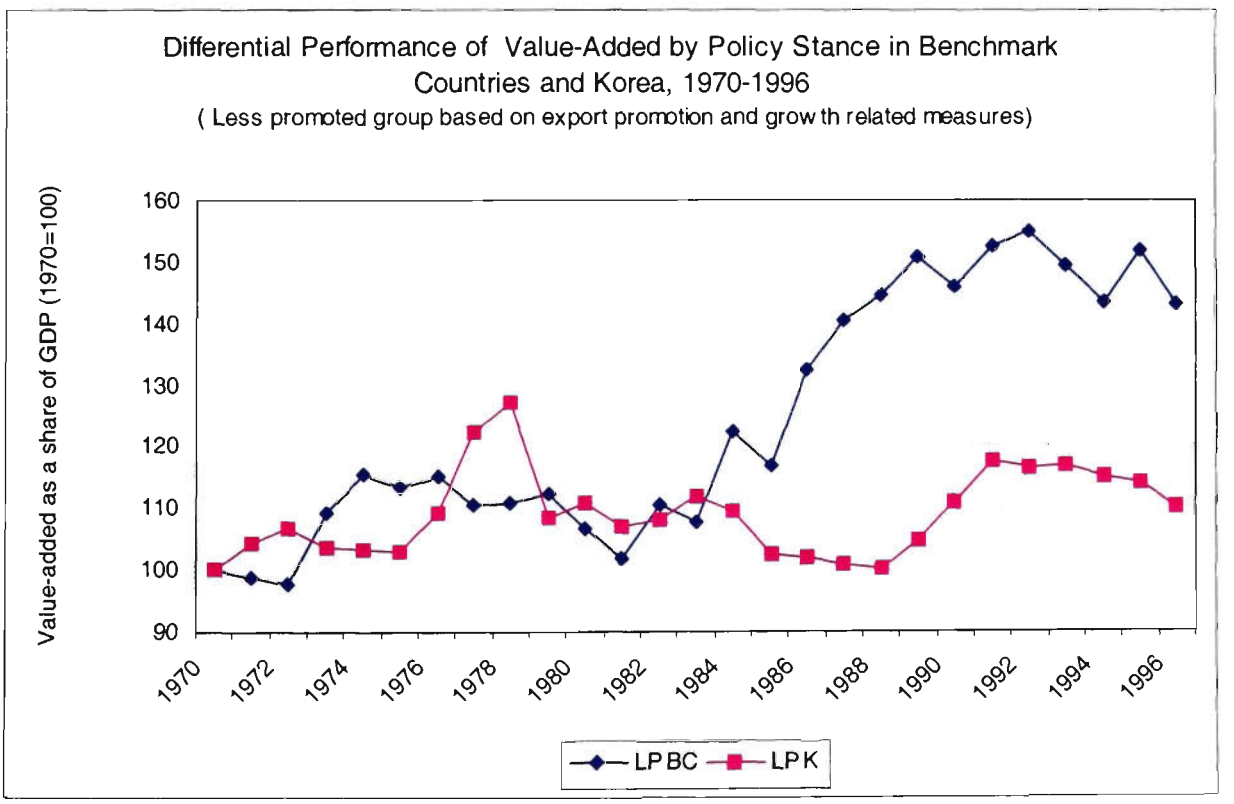


Chart 10.2



this group of industries was double the 1970 level (index level 200) in Korea but lower than the 1970 level in the benchmark countries (index level 96).

Secondly, the performance of value-added as a share of GDP in the less promoted group in Korea is less impressive compared to the similar group in the benchmark countries during the period. By 1996 the index for this group of industries stood at 143 for the benchmark countries and at only 110 for Korea. As can be seen in Table 10.1 (columns 4 and 5) and Chart 10.2, the performance in this particular group in Korea deviates little from that of the benchmark countries until the mid 1980s (index values of 108 and 110 for Korea and the benchmark countries in 1982 respectively). However, the Korean performance fell behind that of the benchmark countries thereafter – the strong expansion in the share of these industries in the benchmark countries after the mid 1980s did not take place in Korea.

The above two basic characteristics are more clearly evident when the comparison between the two policy groups is made by for Korea and the benchmark countries separately. The relevant estimates from Table 10.1 (columns 2, 3, 4 and 5) are displayed in Charts 10.3 and Chart 10.4 in this manner. As is clearly evident from these charts, value-added as a share of GDP in the highly promoted group in Korea is not only comparatively higher but is also increasing at a higher rate than in the less promoted group. By contrast, as can be seen from Chart 10.4, the performance of the two industry groups in terms of value-added as a share of GDP in the benchmark countries follows a quite similar path for the two industry groups. While the highly promoted group remained behind that of less promoted group during the initial period, since the mid 1980s the share of value-added in GDP of the highly promoted group was higher than that of less promoted group. Nevertheless, the performance of value-added as share of GDP in highly promoted group in Korea was still well in advance of that in the benchmark countries.

Using similar measures as those employed for value-added, the aggregate performance of exports as a share of world exports for industry groups can also be

Chart 10.3

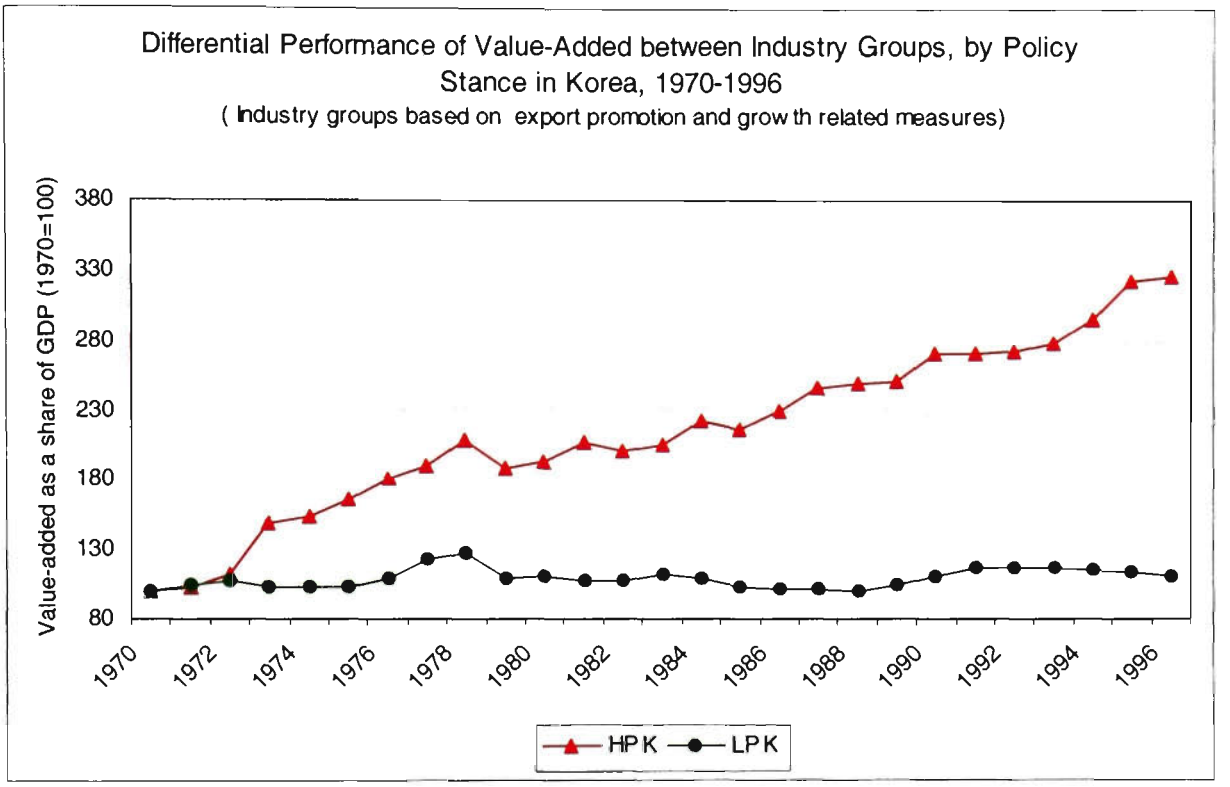
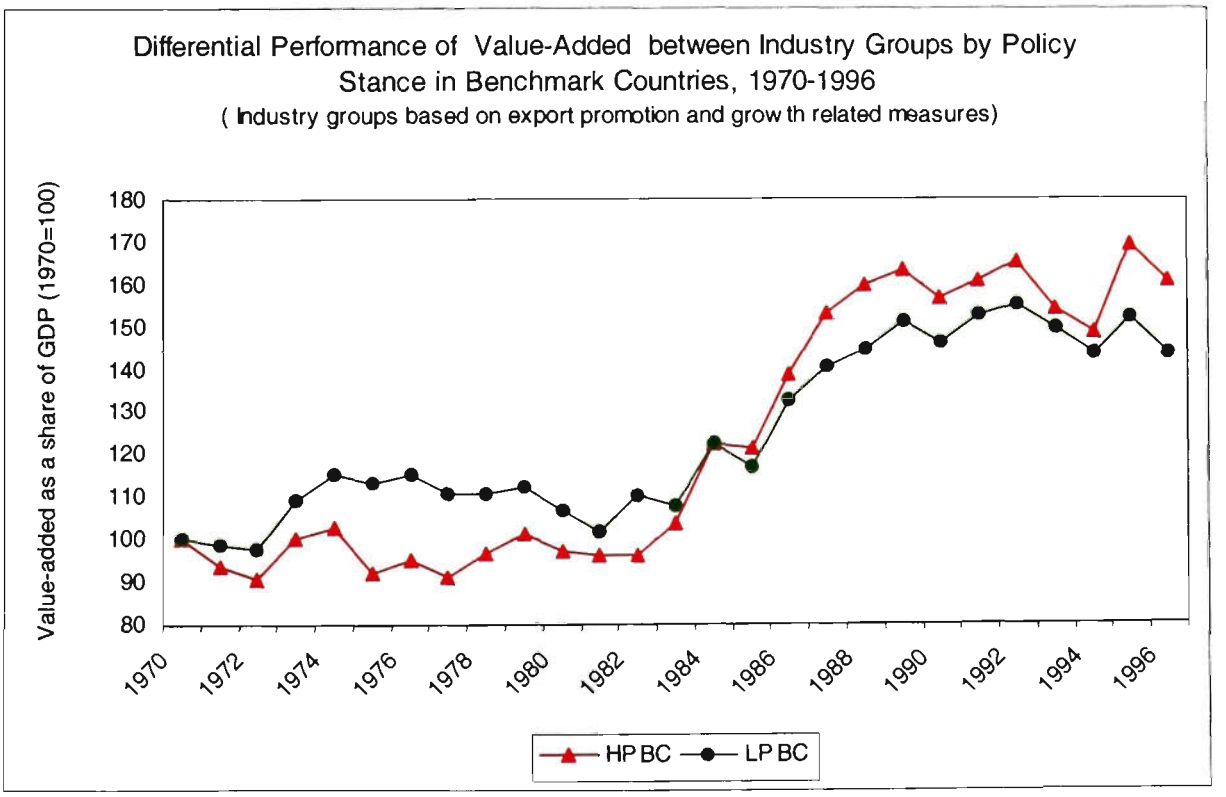


Chart 10.4



studied. The resultant values of exports as a share of world exports, for highly promoted and less promoted groups defined in terms of the export promotion and growth related measures, are presented in Table 10.1 for benchmark countries and Korea respectively, for the period 1970-1996. These estimated results also demonstrate a number of interesting characteristics of the differences in performance between the two groups.

Firstly, the performance of exports as a share of world exports in the highly promoted group in Korea is much stronger than that of the same group in the benchmark countries. As can be seen from the estimates in Table 10.1 (columns 6 and 7) and Chart 10.5, exports as a share of world exports in this particular group in Korea have increased dramatically, both absolutely and relative to that of a similar group in the benchmark countries. By 1996 the relevant index for Korea had reached 784 (an increase of 684 per cent) while for the benchmark countries it was at 228 (an increase of 128 per cent). Thus the highly promoted industries in Korea recorded by 1996 more than a five-fold increase in their share of world exports, when compared to the benchmark countries.

Secondly, the performance of Korea in terms of exports as a share of world exports in the less promoted group, though showing higher levels during the early part of the overall period, remained sluggish relative to the performance of the same industries in the benchmark countries in the latter part of the observed period. As the respective estimates, in Table 10.1 (columns 8 and 9) and Chart 10.6, clearly indicate, the performance of exports as a share of world exports in this particular group in Korea were considerably stronger during the 1970s and early 1980s than in the benchmark countries. But during the 1980s the export performance of these industries declined in Korea while strengthening in the benchmark countries. As a result of these various trends, the index numbers for the Korea and the benchmark countries were almost identical by 1996.

The performance differences of exports as a share of world exports between the highly promoted and the less promoted groups are again more clearly evident when the comparison is made taking Korea and the benchmark countries separately. The story shown by analysing the value-added measure is quite closely replicated with exports.

Chart 10.5

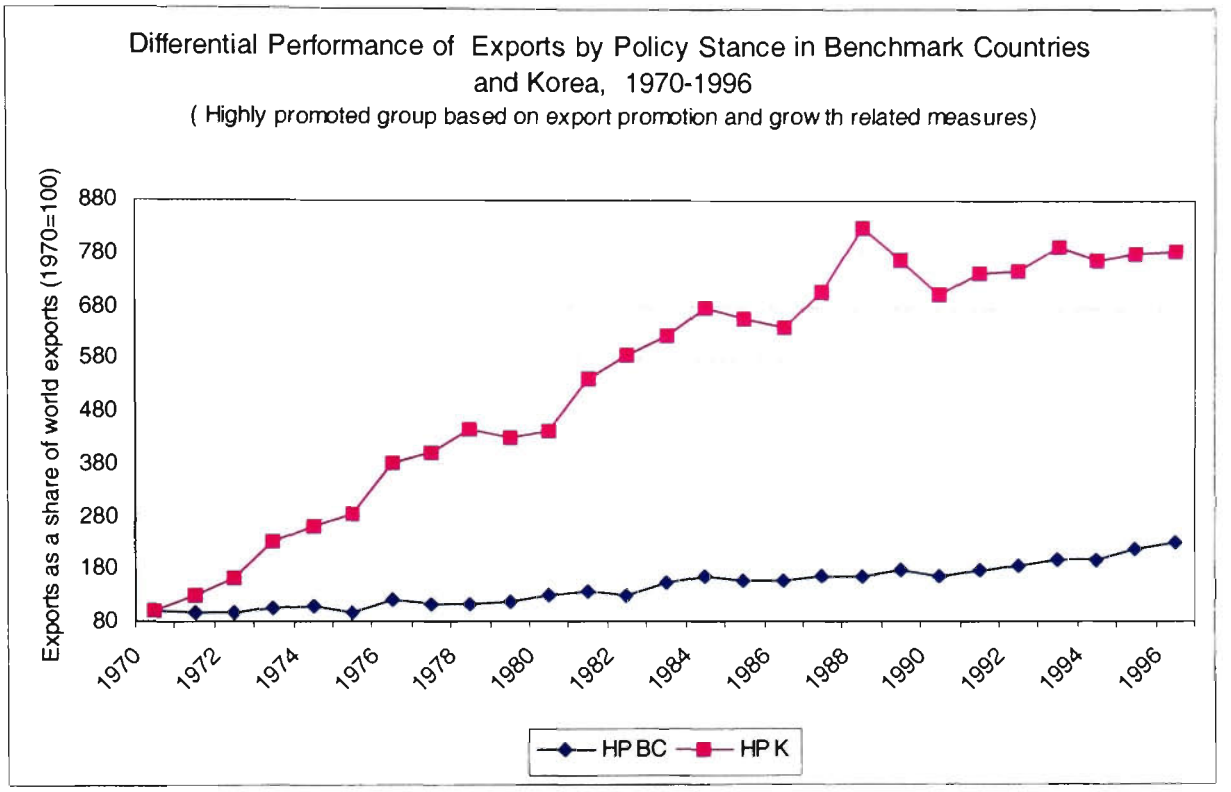


Chart 10.6

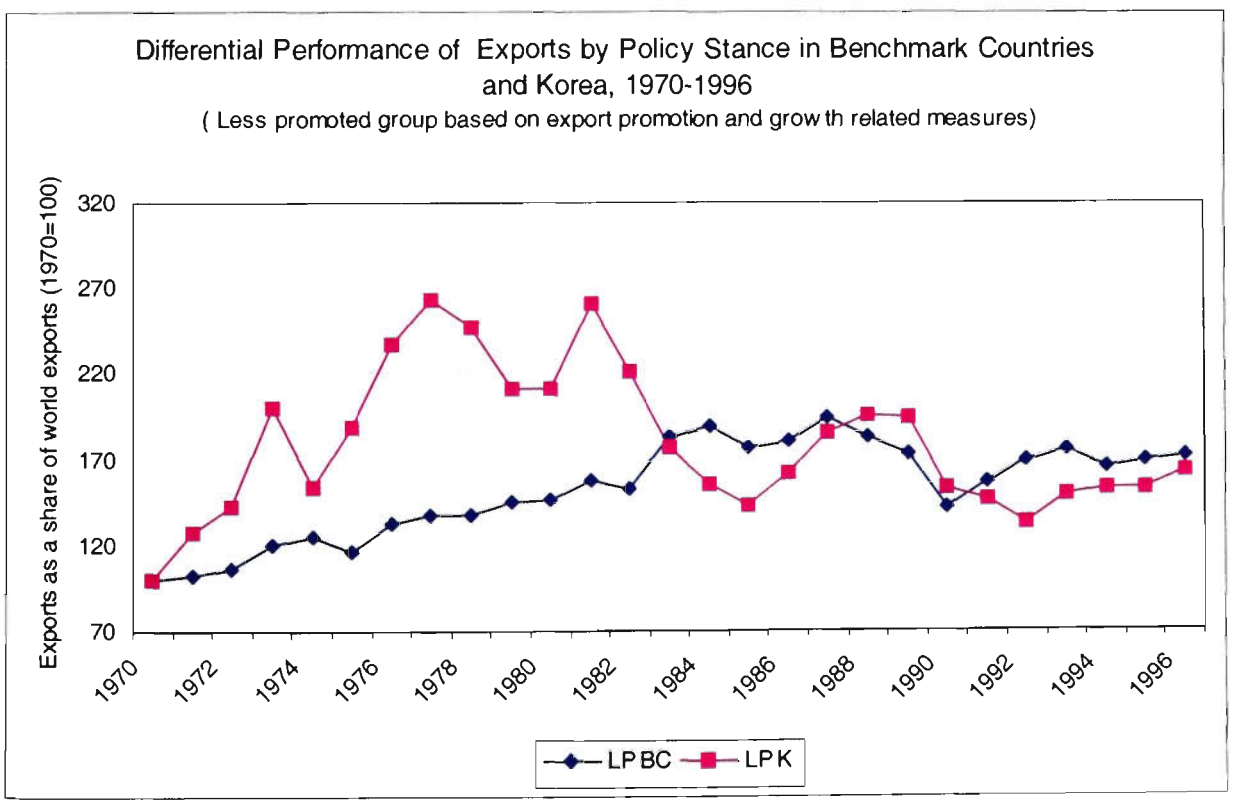


Chart 10.7

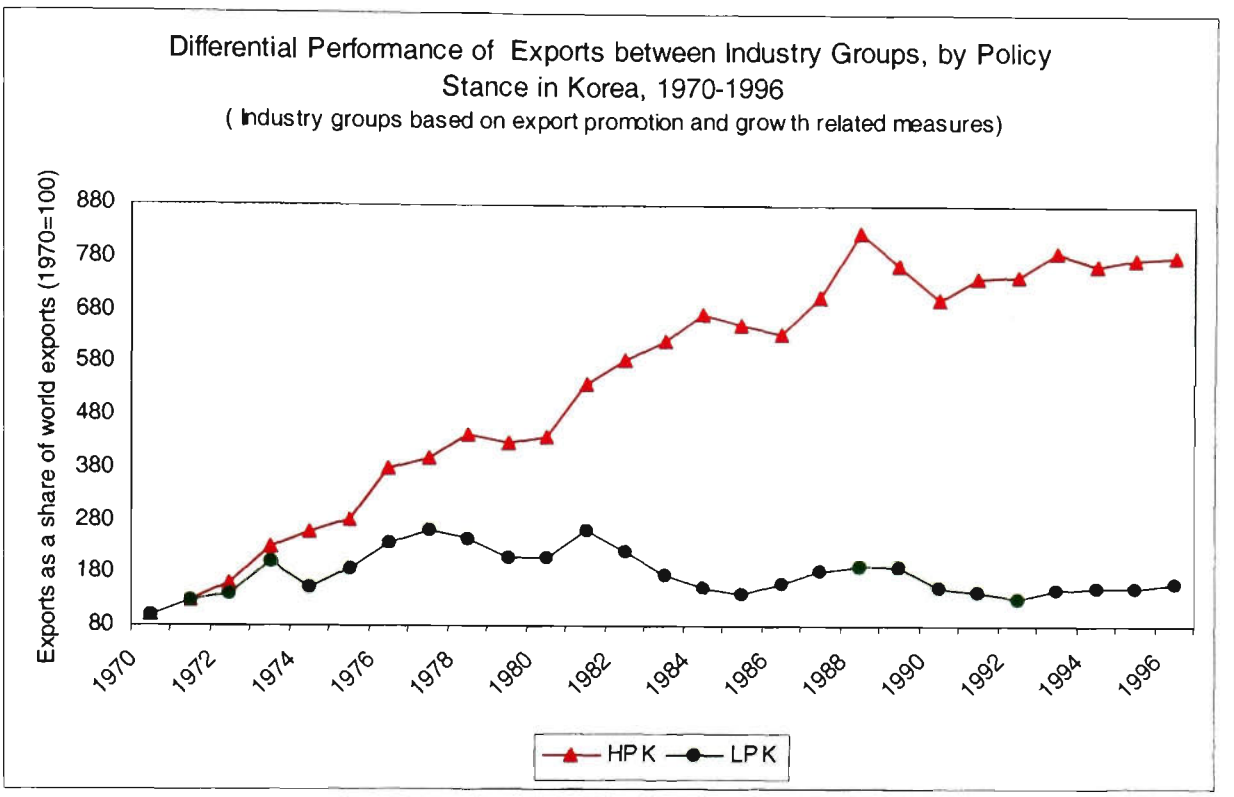
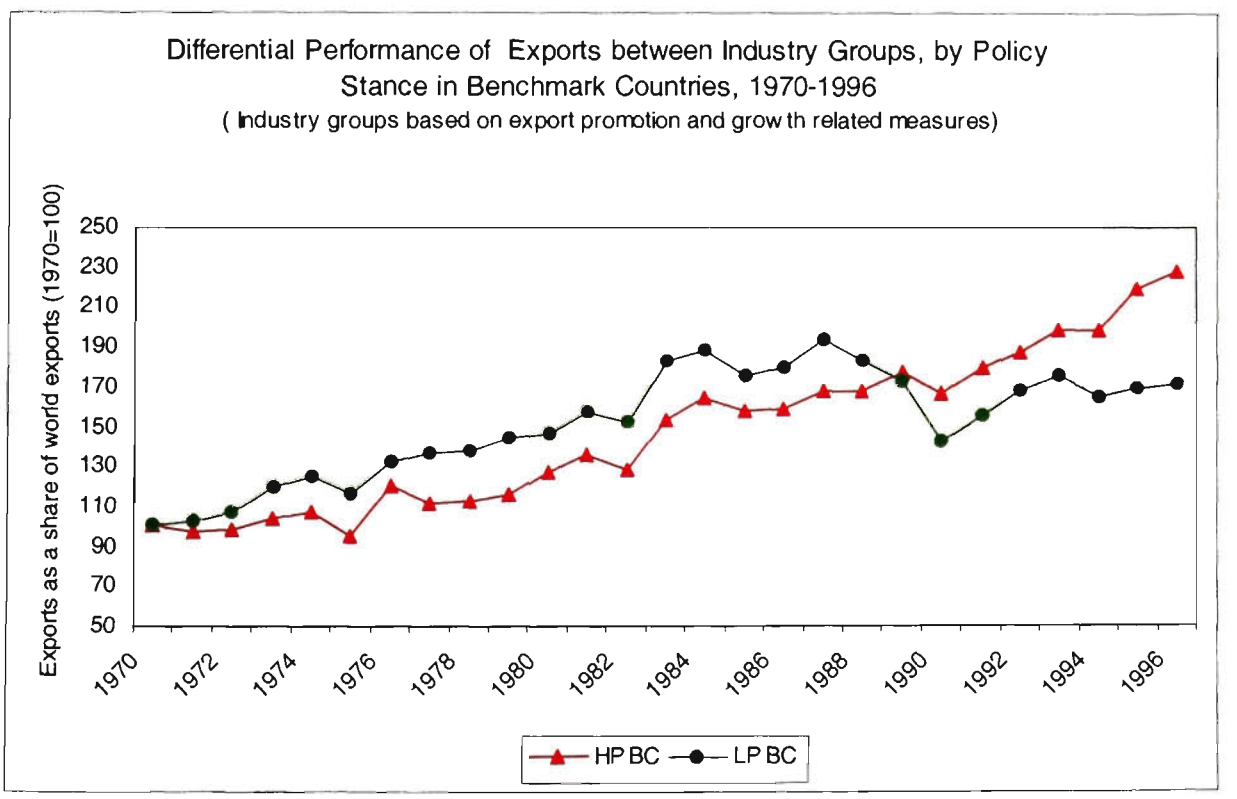


Chart 10.8



The data in Table 10.1 (columns 6, 7, 8 and 9) and Charts 10.7 and 10.8 illustrate the performance of exports as a share of world exports in the highly promoted and the less promoted groups for Korea and the benchmark countries respectively. As Chart 10.7 shows, exports as a share of world exports in the highly promoted group in Korea were not only relatively higher but also increased at a significantly higher rate than those of the less promoted group until the early 1990s. By contrast in the benchmark countries, as can be seen from Chart 10.8, the performance of exports as a share of world exports in less promoted groups was higher than in the highly promoted industries until the early 1990s. The difference between Korea and the benchmark countries in terms of the relative export performance of the two industry groups is quite remarkable.

Table 10.2 Growth Rates by Policy Stance, 1970-96
(Based on export promotion and growth related measures)

Industry Groups	Average Annual Rate of Growth (%)	
	Value-Added as a Share of GDP	Exports as a Share of World Exports
Highly Promoted Group		
Korea	4.6	8.2
Benchmark Countries	1.8	3.2
Less Promoted Group		
Korea	0.4	1.9
Benchmark Countries	1.4	2.1

Source: Estimates based on Trade and Production data accessed through IEDB (ANU).

To express in a different way the performance differences between industry groups, annual average growth rates of value-added as a share of GDP and of exports as a share of world exports by policy stance, have been calculated, and are presented in Table 10.2. These data summarise the main results from the analysis above. First, the performance of the highly promoted group in Korea is much better, compared to the same group in the benchmark countries and both in terms of value-added and of exports, than that of the less promoted group for both variables. The average annual growth rates for

Korea are more than double those of the benchmark countries for the highly promoted group, but are lower for Korea for the less promoted group. Second, for Korea, the growth rates for both variables are much higher for the highly promoted than for the less promoted group, while for the benchmark countries the differential is modest.

10.2.2 Differential Performance of Industry Groups based on Import Substitution Related Measures

To examine performance differences according to policy stance further, in this section we will use aggregate data on two different groups of industries – highly promoted (HP) and less promoted (LP) – defined in terms of import substitution policies and hence in terms of the ranks appearing in Table 8.8. Accordingly, on the basis of import substitution related measures, the highly promoted group will include four industrial sectors (Food, Textiles, Fabricated Metals and Chemicals) and the less promoted group includes the other four industrial sectors (Paper, Wood, Basic Metals and Non Metallic Minerals). It is important to note that, though the order of rank based on import substitution related measures differs significantly from that of export promotion and growth measures, only one change is made in assembling the new industry groups. This is the inclusion of the Food, in the highly promoted group in place of Basic Metals, which moves to the less promoted group. The commonality of three industries in the highly promoted group reflects the Korean tendency to use a range of different instruments to support a particular industry. Nevertheless, in spite of the relatively limited change in the composition of the two groups, some significant performance differences are apparent. These reflect, of course, the relative effects of the two industries that have been interchanged.

The differential performance of Korea and the benchmark countries in terms of value-added as a share of GDP and exports as a share of world exports, for industry groups that are based on import substitution related measures and for the period 1970-96, are presented in Table 10.3 and the respective charts. Some of the main results of this exercise are noted below.

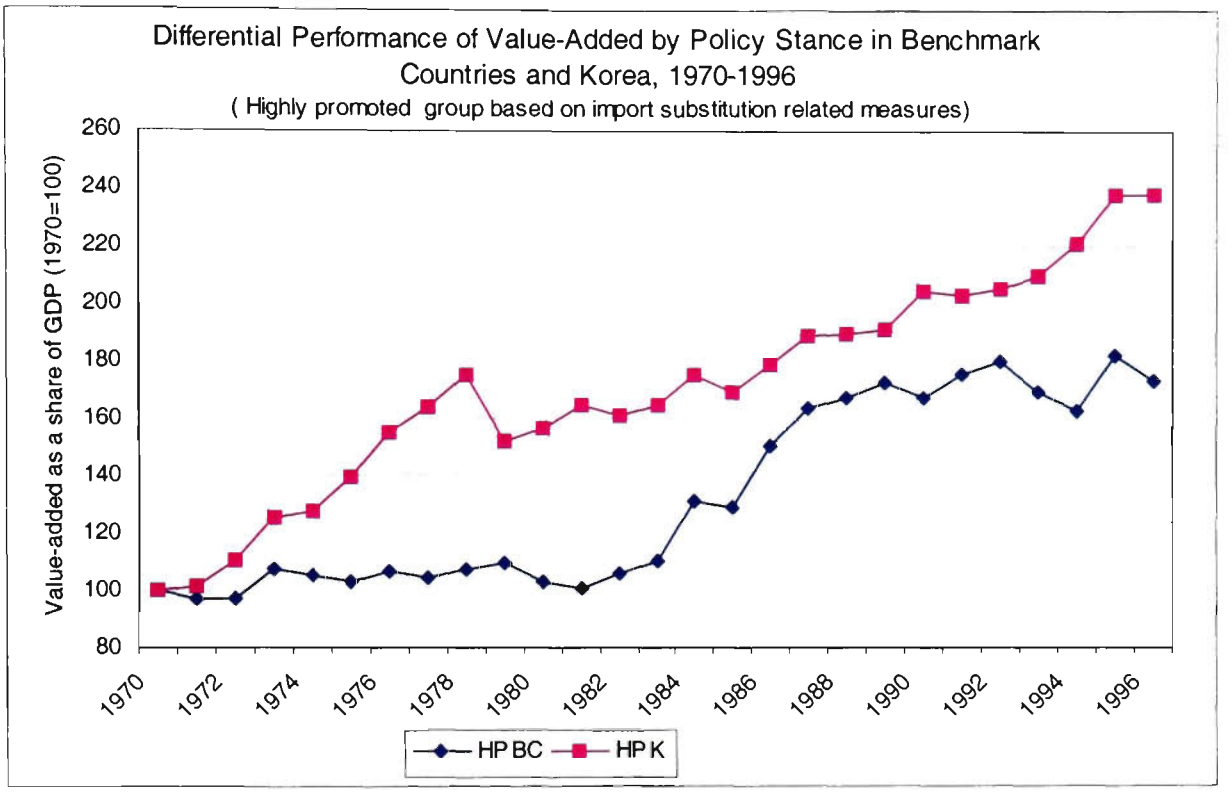
Table 10.3 Differential Performance of Industry Groups, by Policy Stance in Korea and Benchmark Countries, 1970-1996

Period	Import Substitution Related Measures							
	Value-Added as a Share of GDP (1970=100)				Exports as a Share of World Exports (1970=100)			
	HP-BC	HP-K	LP-BC	LP-K	HP-BC	HP-K	LP-BC	LP-K
1970	100	100	100	100	100	100	100	100
1971	97	102	91	110	108	125	91	129
1972	97	110	82	108	112	151	91	152
1973	107	125	90	151	118	218	104	211
1974	105	127	110	152	132	234	100	176
1975	103	139	86	140	119	281	91	189
1976	107	155	86	131	135	358	116	256
1977	105	164	76	151	129	379	116	282
1978	107	175	84	170	129	415	119	274
1979	110	152	91	165	130	379	127	255
1980	103	157	92	166	145	381	128	265
1981	100	164	90	167	158	464	134	333
1982	106	161	85	165	151	485	128	315
1983	111	165	90	174	168	521	165	272
1984	131	175	99	179	182	567	167	256
1985	129	169	97	167	176	564	155	227
1986	150	178	101	169	178	544	158	248
1987	164	189	112	173	184	610	173	276
1988	167	189	123	176	180	724	168	294
1989	172	191	126	186	187	662	163	295
1990	167	204	118	204	170	598	140	253
1991	175	203	114	222	190	624	147	258
1992	180	205	115	217	196	604	161	267
1993	169	210	109	217	206	637	170	294
1994	163	221	105	219	206	635	160	277
1995	182	238	117	227	227	659	166	266
1996	173	238	109	224	233	659	172	282

Source: Estimates based on Trade and Production data accessed through IEDB (ANU).

Notes: HP-BC – Highly Promoted group in benchmark countries
HP-K – Highly Promoted group in Korea
LP-BC – Less Promoted group in benchmark countries
LP-K – Less Promoted group in Korea

Chart 10.9



Chat 10.10

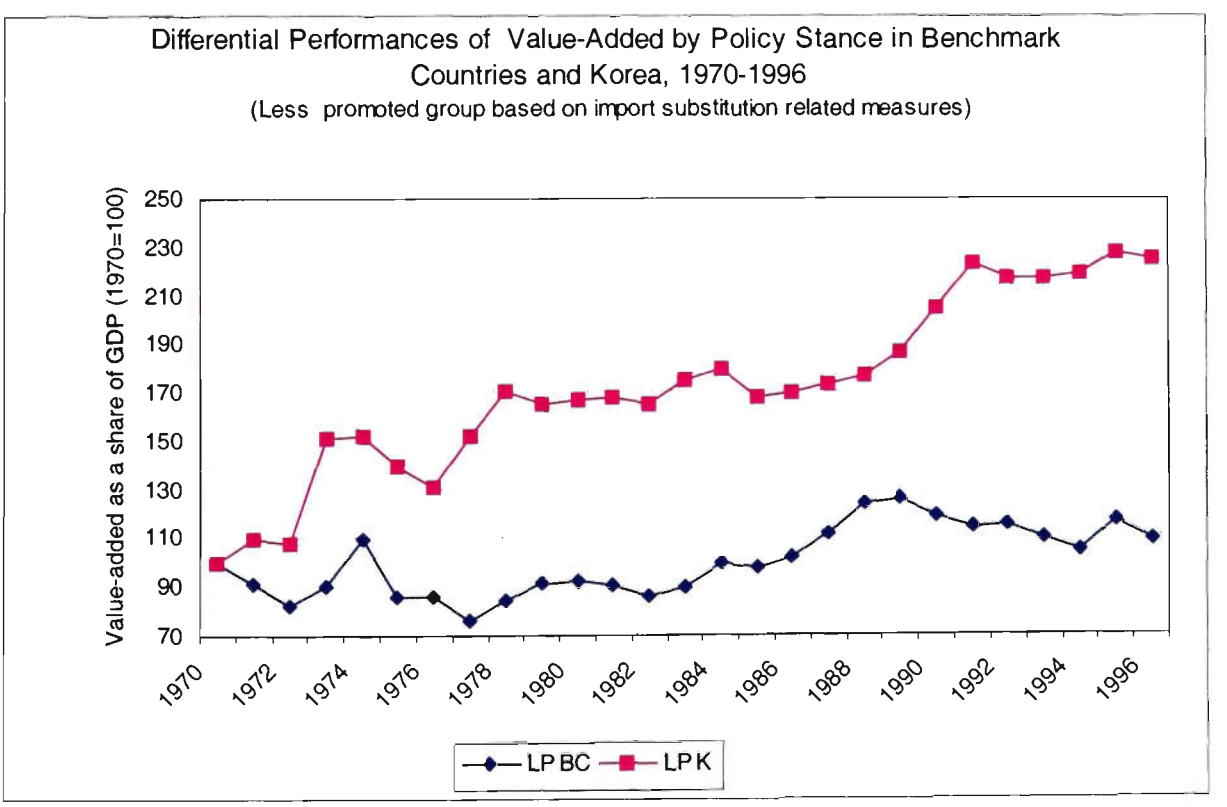


Chart 10.11

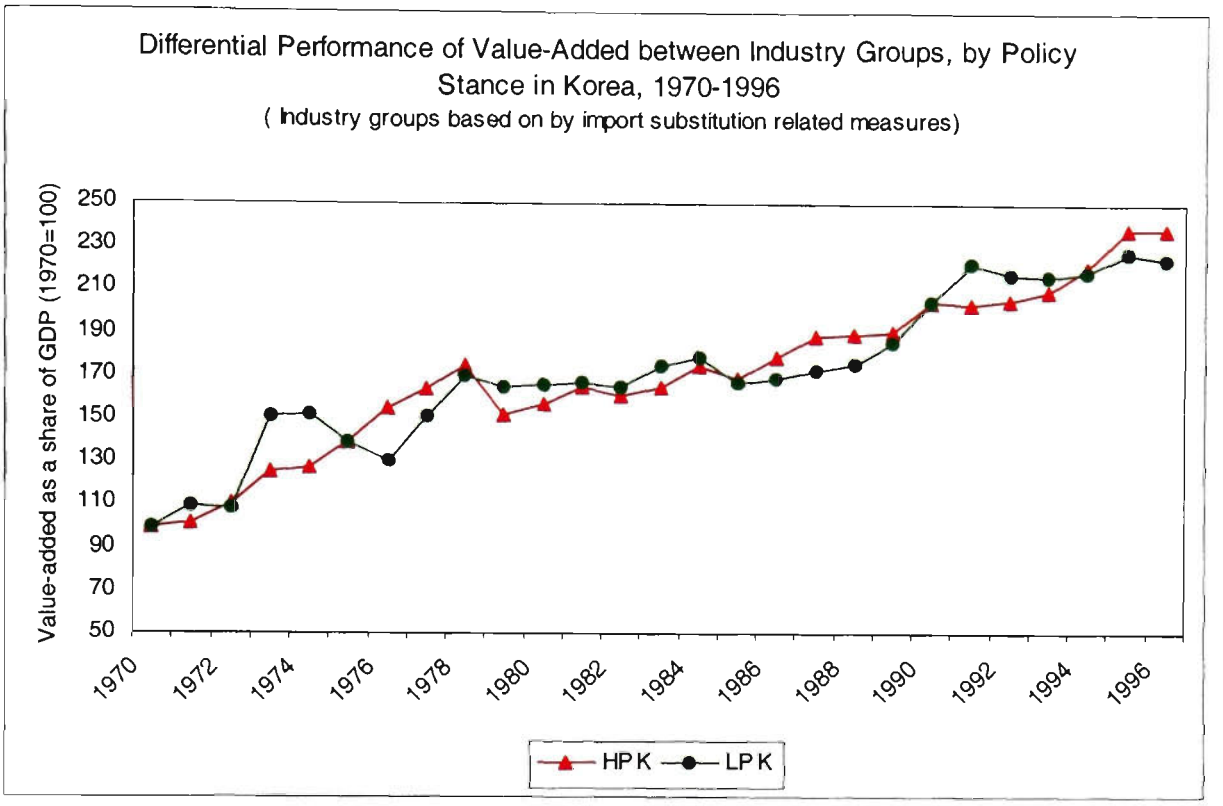
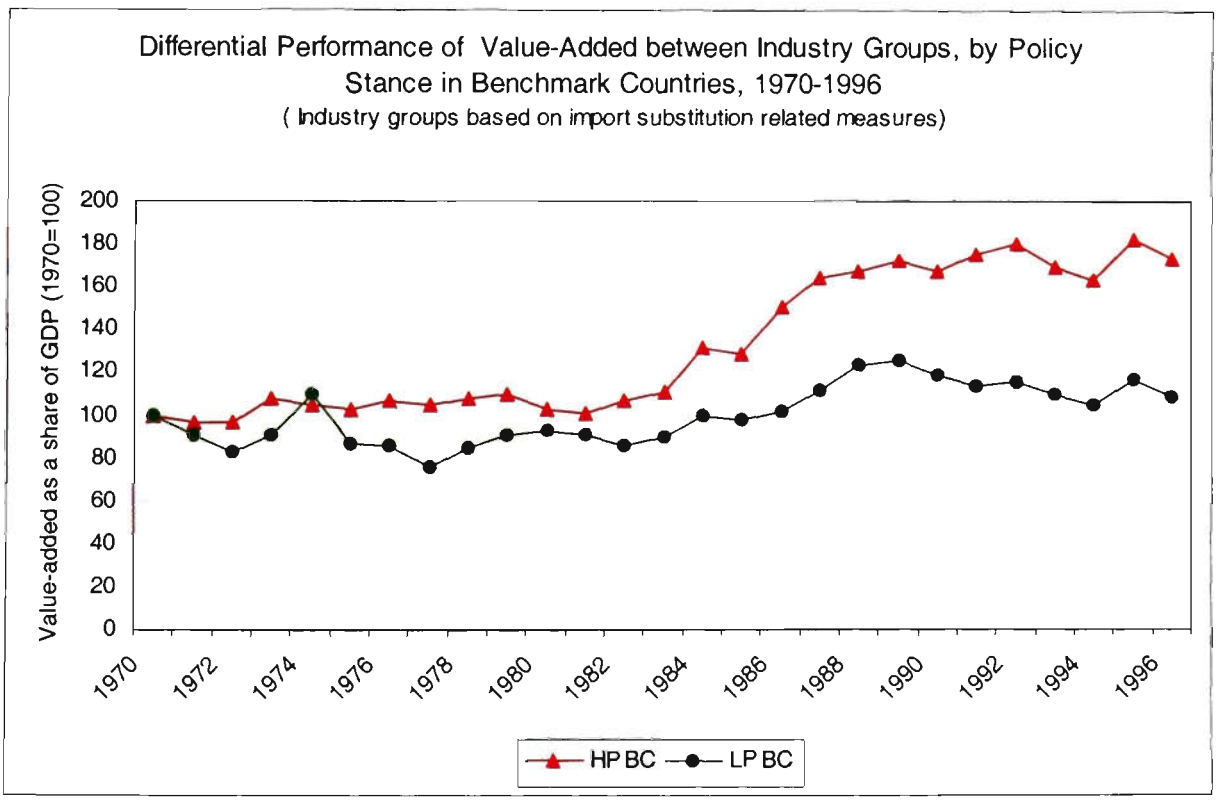


Chart 10.12



Firstly, as can be seen from Table 10.3 (columns 2 and 3) and Chart 10.9, the performance of Korea in value-added as a share of GDP in the highly promoted group, defined in terms of import substitution measures, is better than that of the same group in benchmark countries. Like in the estimates reported in the previous section, the relative performance of this particular group in Korea is particularly noticeable in the early part of the period. However, there is a much less favourable relative performance of Korea in the later part of the period than observed with the earlier definition of the highly promoted group (Chart 10.1). Further, in both periods the better relative performance in Korea is only about half that reported in Table 10.1 for the case in which the highly promoted group is defined in terms of export and growth measures.

Secondly, the performance of value-added as a share of GDP in the less promoted group, defined in terms of import substitution measures, is also relatively higher in Korea than in the same group of industries in benchmark countries. As can be seen from the estimates of Table 10.3 (columns 4 and 5) and Chart 10.10, Korean performance in this particular sector remained at comparatively higher levels than that of a similar group in benchmark countries throughout the observed period. Indeed, in terms of this definition of highly promoted and less promoted groups of industries, the relative performance of Korea is stronger in the less promoted industries.

This conclusion can be brought out in another way by comparing the performance of the two country groupings individually in terms of value-added as a share of GDP for the industry groups. When Korea and the benchmark countries are considered separately there is no significant difference between two groups in the case of Korea, as can be seen from Chart 10.11. By contrast, in the benchmark countries the performance of value-added as a share of GDP in the highly promoted group is much stronger than in the other group (see Chart 10.12).

Exports as a share of world exports in the highly promoted group based on import substitution measures in Korea show a much stronger relative performance than that of value-added. As can be seen from Table 10.3 (columns 6 and 7) and Chart 10.13, exports

as a share of world exports in that particular group in Korea has shown remarkable growth relative to the same group in the benchmark countries. This growth in Korean relative exports for highly promoted industries defined in this way is almost comparable to that when this group is defined in terms of export and growth promotion measures.

Similarly impressive results are evident for the less promoted group based on import substitution measures in Korea. As the data in Table 10.3 (columns 8 and 9) and Chart 10.14 shows, Korean performance in terms of exports as a share of world exports in that particular group remain higher than that of a similar group in benchmark countries over the whole period.

Finally, using comparisons within Korea and the benchmark countries taken individually, it is clearly evident from Chart 10.15 that the export performance in the highly promoted group in Korea is significantly higher than that of less promoted group. However, most of this superior performance emerged after 1982. For the benchmark countries, exports as a share of world exports in the highly promoted group remained higher than that of less promoted group for the whole period, although the differential was not nearly as large as for Korea.

To further investigate the performance differences between the two industry groups based on import substitution measures, the annual average growth rates for value-added as a share of GDP and for exports as a share of world exports have been calculated for the period 1970-96. These estimates are presented in Table 10.4. They show that the annual average growth rates for the highly promoted group in Korea are higher for both indicators than those of the same group in the benchmark countries.

But, by contrast with the figures based on the export and growth definition, the annual average growth rates of value-added and exports of less promoted group in Korea are also comparatively higher than that of benchmark countries. Thus, on the import substitution definition of the promotion groups, there is little difference in outcomes

Chart 10.13

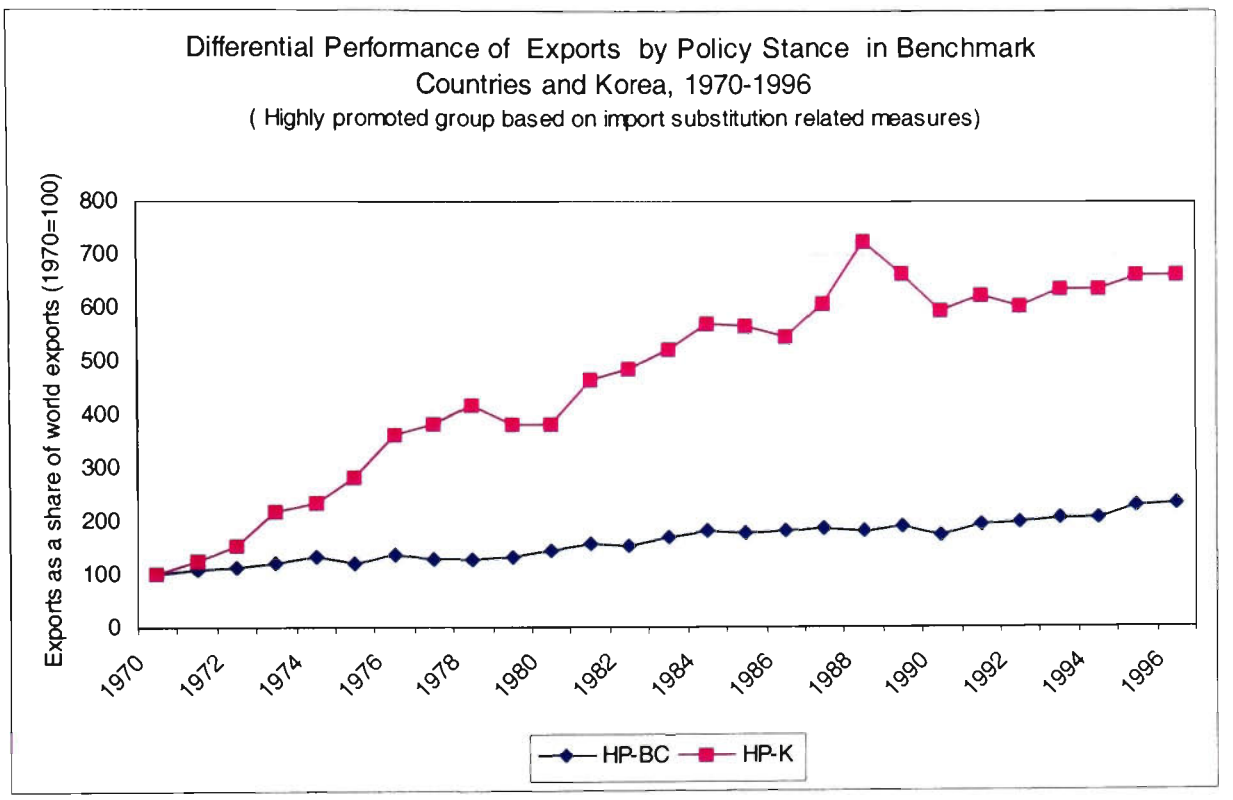


Chart 10.14

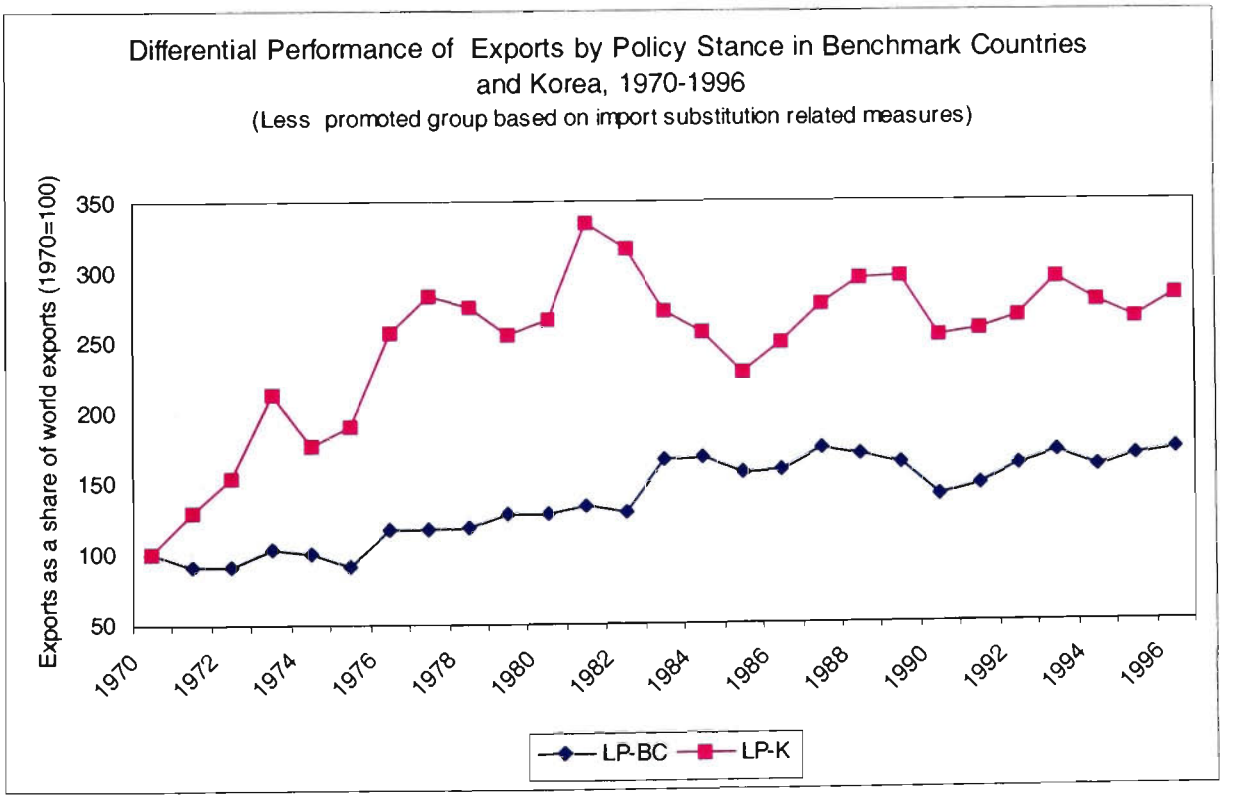


Chart 10.15

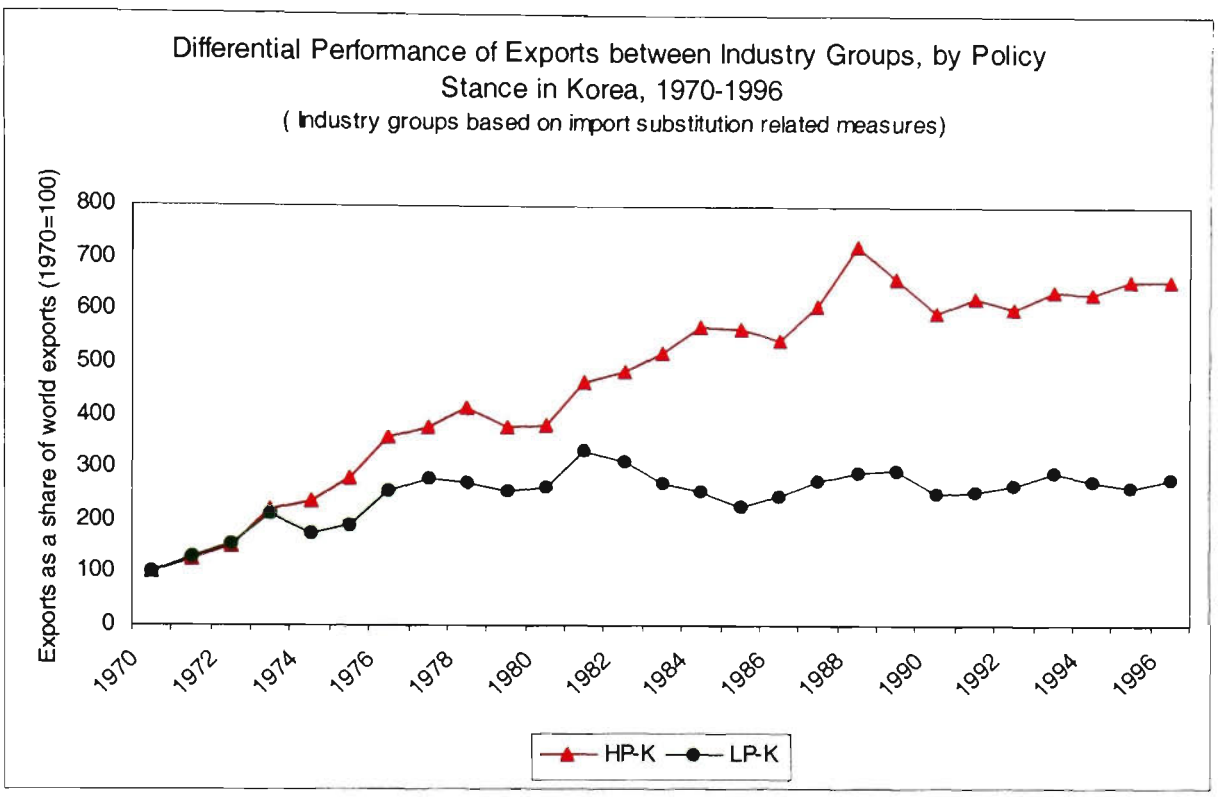
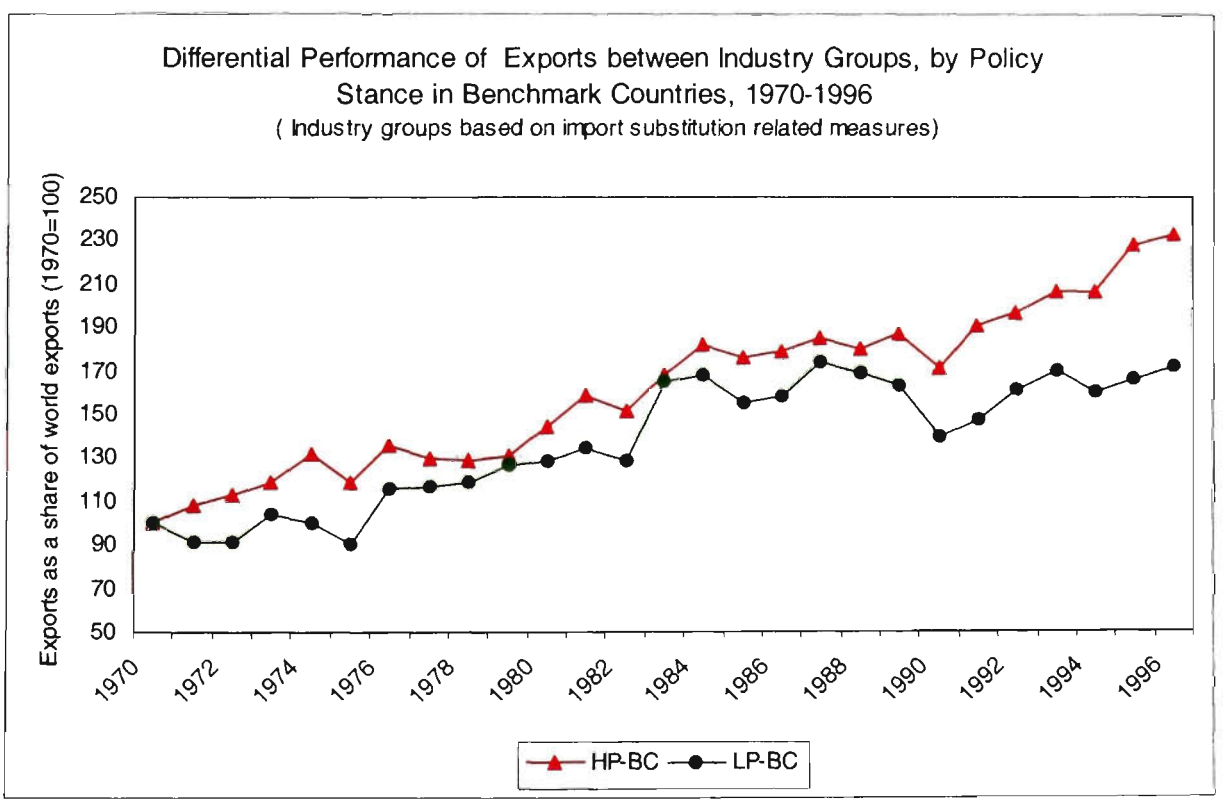


Chart 10.16



between the highly promoted and the less promoted growth, relative to trends in the benchmark countries.

Table 10.4 Growth Rates by Policy Stance, 1970-96
(Based on import substitution related measures)

Industry Groups	Average Annual Rate of Growth (%)	
	Value-Added as a Share of GDP	Exports as a Share of World Exports
Highly Promoted Group		
Korea	3.4	7.5
Benchmark Countries	2.1	3.3
Less Promoted Groups		
Korea	3.2	4.1
Benchmark Countries	0.3	2.1

Source: Estimates based on Trade and Production data accessed through IEDB (ANU).

Overall, all the empirical evidence covered in sections 10.2.1 and 10.2.2 reveals several important conclusions. One is that the value-added and export performance of the highly promoted groups in Korea is much stronger than that of the same group in the benchmark countries. Moreover, the value-added and export performance of the highly promoted group is also much stronger than that of the less promoted group within Korea. Further, the performance of the highly promoted group, defined in terms of export promotion and growth measures, is stronger relative to that of the benchmark countries than that of a similar group defined in terms of import substitution measures. These results are consistent with the view that industrial policies have had a significant impact on Korean industrial development and that export promotion and growth measures might be more beneficial to an economy than import substitution measures.[1]

[1] These results are however subjected to qualifications due to the simultaneous application of export promotion and import substitution in Korea.

10.3 Differential Performances of Industry Groups by Policy Periods

As a second step in exploring the possible association between superior industrial performance and government intervention in Korea, in this section we will examine whether there are apparent differences in performance in terms of value-added and exports between Korea and benchmark countries during the so-called high intervention period and the period thereafter. If government intervention has had any significant impact on the performance of the industrial sector in Korea, the value-added and exports of manufacturing in general, and of the highly promoted group in particular, will show stronger growth relative to the benchmark countries during the high intervention period than in the period thereafter.

For this purpose, in this section we examine value-added and export performance for the highly promoted and less promoted groups, based on both definitions, for the benchmark countries and for Korea for the period between 1970-82 and 1982-1996. The available literature frequently cites the 1970s as the high intervention period and those policy initiatives changed significantly with the introduction of comprehensive stabilization measures since 1982 (see Chapter 5 Section 5.3). In this analysis therefore the period (1970-82) is selected to represent the high intervention period, and for that period data are adjusted taking 1970 (=100) as the base year. The latter period represents the period after the high intervention phase and for this period data are adjusted taking 1982 (=100) as the base year.

10.3.1 Differential Performance of Industry Groups by Policy Periods, based on the Export Promotion and Growth Related Measures

In this section the performance differences in terms of value-added and exports between industry groups, defined in terms of export promotion and growth related measures, for the benchmark countries and Korea for the periods 1970-82 and 1982-1996 respectively, will be examined. The relevant data are presented in Table 10.5. The top part of this table shows values taking 1970 as the base year while the bottom part indicates the values taking 1982 (=100) as the base year.

Data on value-added as a share of GDP for the highly promoted group so defined are presented, for benchmark countries and Korea for periods 1970-82 and 1982-96 respectively, in Table 10.5 (column 2 and 3), Chart 10.17 and Chart 10.18. Similar data for value-added as a share of GDP in the less promoted group are presented in Table 10.5 (column 4 and 5), Chart 10.19 and Chart 10.20.

For the highly promoted group, value-added as a share of GDP doubled in Korea over the period 1970-82, while falling slightly in the benchmark countries. This strong relative growth was not maintained over 1982-96, for which period the increase in the share of this group of industries in GDP was very similar in Korea and the benchmark countries. Thus the higher relative level achieved in Korea by 1982 was maintained but not increased after 1982. The performance gap of value-added as a share of GDP between benchmark countries and Korea is notable between the period 1985-1993. For the less promoted group, there was little difference between trends in Korea and the benchmark countries over the 1970-82 period, but value-added as a share of GDP fell in Korea relative to the benchmark countries after 1985. Along with benchmark countries though Korean performance has improved between 1988-1992, the gap in performance of value-added as a share of GDP in less promoted group continued throughout 1985-1996. Thus these data are consistent with a significant policy effect – there was strong relative growth in Korea in the promoted industries in the intervention period, but this was evident neither in the non-intervention period nor in the less promoted group. Further, the relative position of the highly promoted sector was better sustained after 1982 than that of the less promoted group of industries.

The picture is broadly similar for exports. Estimates of exports as a share of world exports for the highly promoted group, again defined in terms of export promotion and growth measures, for the benchmark countries and Korea and for two periods, are presented in Table 10.5 (columns 6 and 7), Chart 10.21 and Chart 10.22 respectively. Like the estimates of value-added, these figures reveal impressive results during the high intervention period in Korea – Korea shows much stronger growth in export shares than

Table 10.5 Differential Performances of Industry Groups, by Policy Periods in Korea and Benchmark Countries, 1970-1996

Period	Export Promotion and Growth Related Measures							
	Value-Added as a Share of GDP				Exports as a Share of World Exports			
	HP-BC	HP-K	LP-BC	LP-K	HP-BC	HP-K	LP-BC	LP-K
1970	100	100	100	100	100	100	100	100
1971	94	103	99	104	97	126	102	128
1972	91	112	98	107	98	162	106	143
1973	100	149	109	103	104	230	119	200
1974	102	153	115	103	107	258	125	154
1975	92	165	113	103	95	280	116	188
1976	95	180	115	109	120	378	132	237
1977	91	189	110	122	111	397	137	263
1978	97	207	111	127	112	442	138	247
1979	101	188	112	108	115	426	145	210
1980	97	192	107	111	127	439	146	210
1981	96	206	102	107	136	542	157	260
1982	96	200	110	108	128	585	152	221
	HP-BC	HP-K	LP-BC	LP-K	HP-BC	HP-K	LP-BC	LP-K
1982	100	100	100	100	100	100	100	100
1983	108	103	98	104	119	106	120	80
1984	127	111	111	101	127	115	124	70
1985	126	108	106	95	122	111	116	65
1986	144	115	120	94	123	109	118	73
1987	159	123	127	93	130	121	127	84
1988	166	125	131	93	130	141	120	88
1989	169	126	137	97	137	131	114	88
1990	163	136	132	103	129	120	93	69
1991	167	135	138	109	139	127	102	66
1992	171	136	140	108	146	128	111	60
1993	160	139	135	108	154	135	115	67
1994	154	148	130	107	154	131	108	69
1995	176	161	138	105	171	133	111	69
1996	167	163	130	102	178	134	113	74

Source: Estimates based on Trade and Production data accessed through IEDB (ANU).

Notes: HP-BC – Highly Promoted group in benchmark countries
HP-K – Highly Promoted group in Korea
LP-BC – Less Promoted group in benchmark countries
LP-K – Less Promoted group in Korea

Chart 10.17

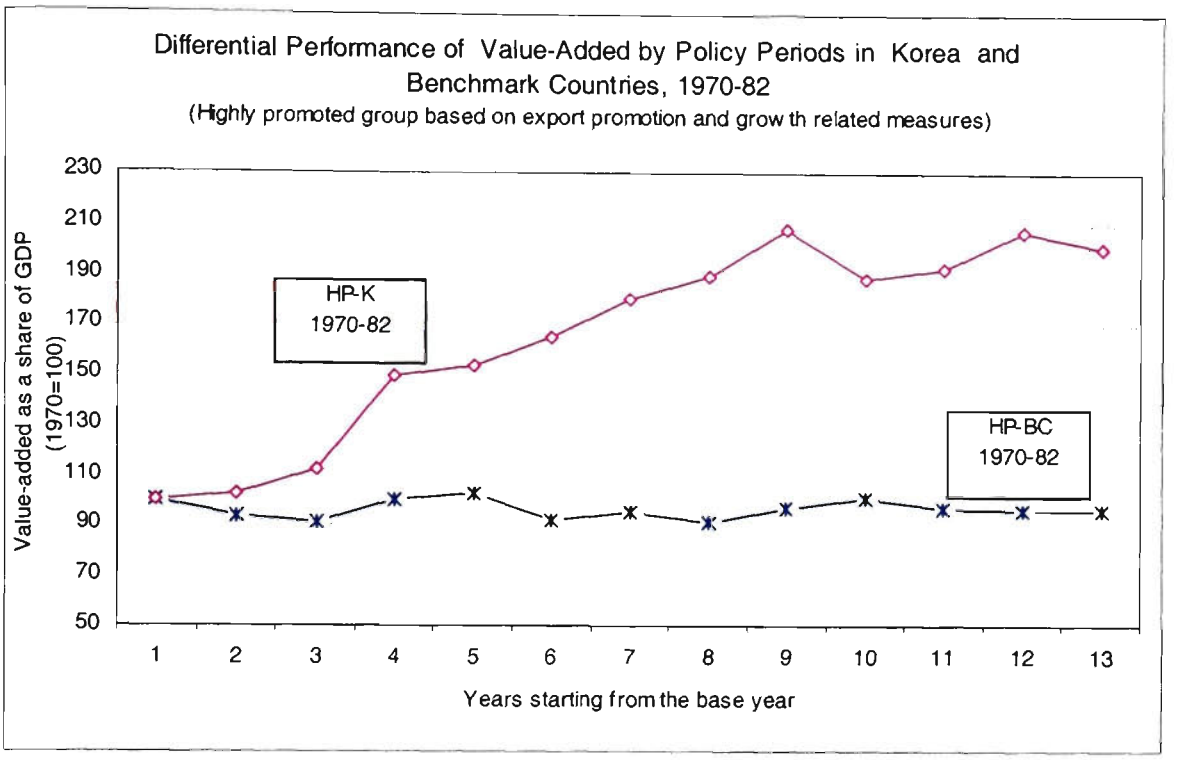


Chart 10.18

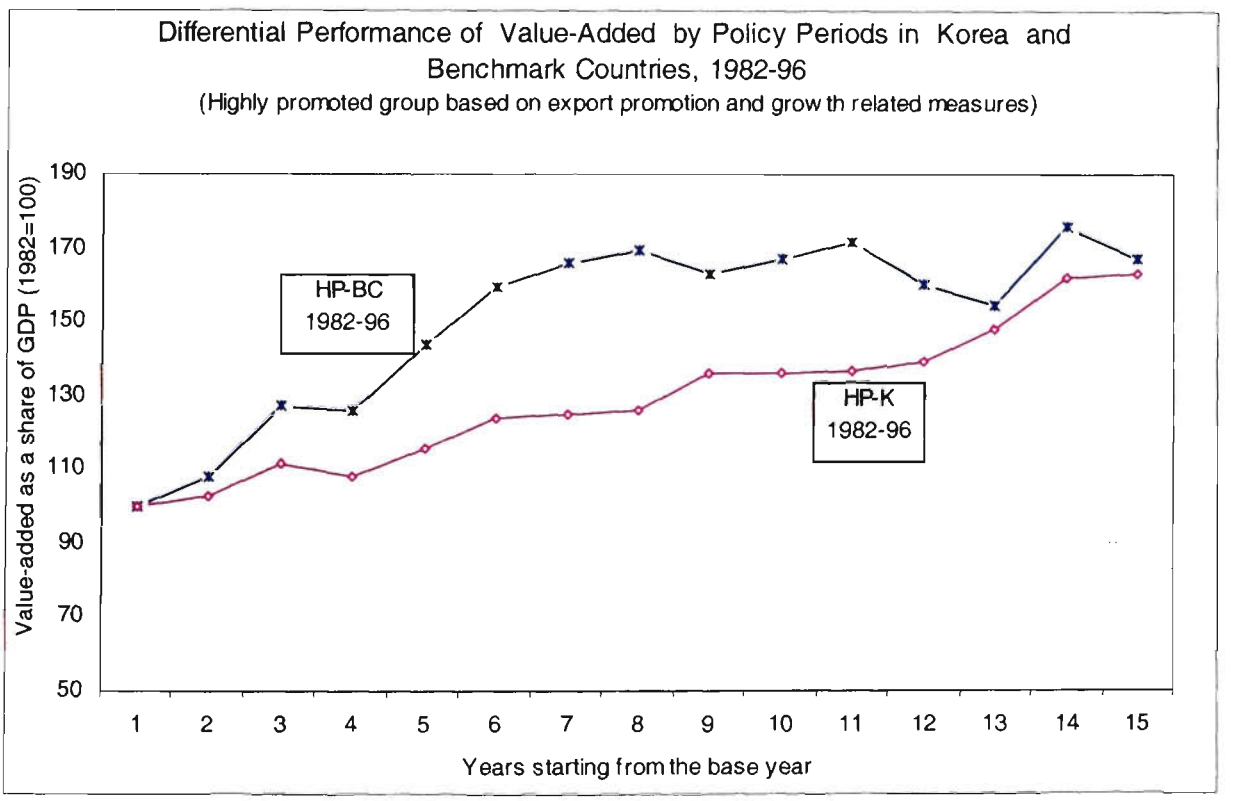


Chart 10.19

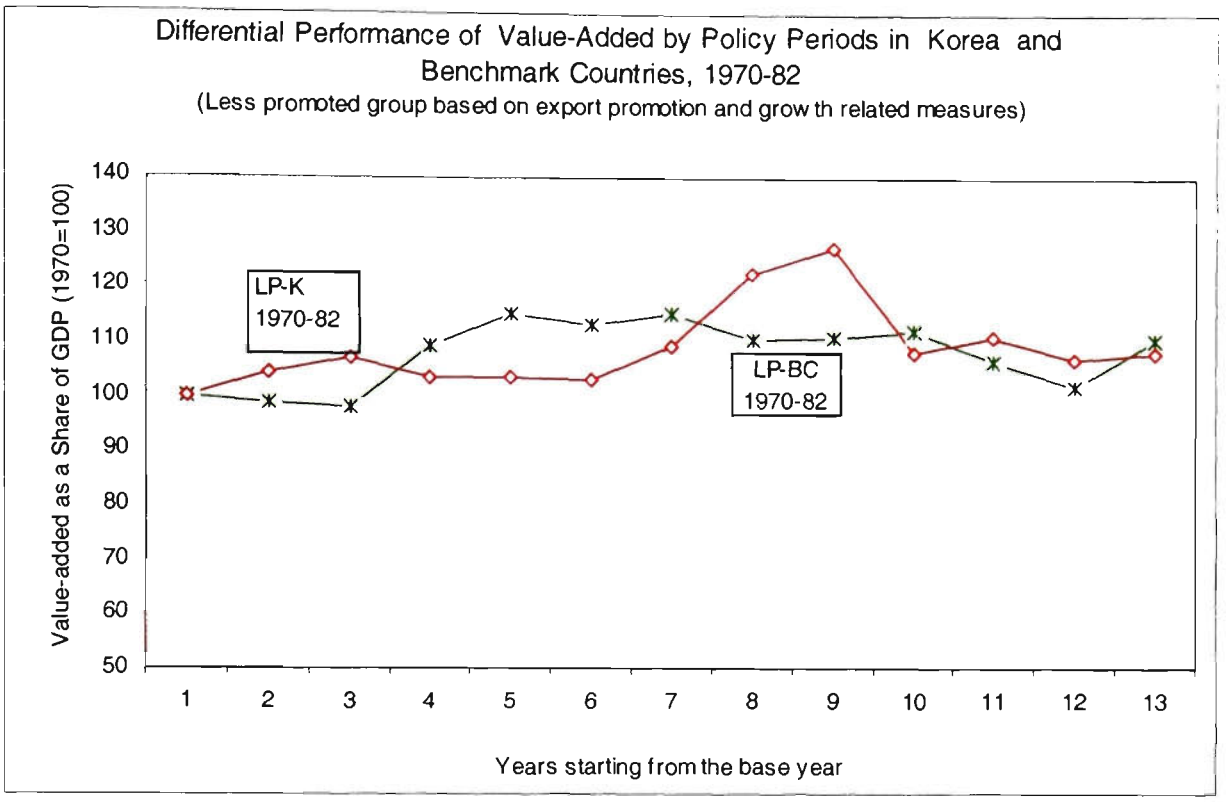


Chart 10.20

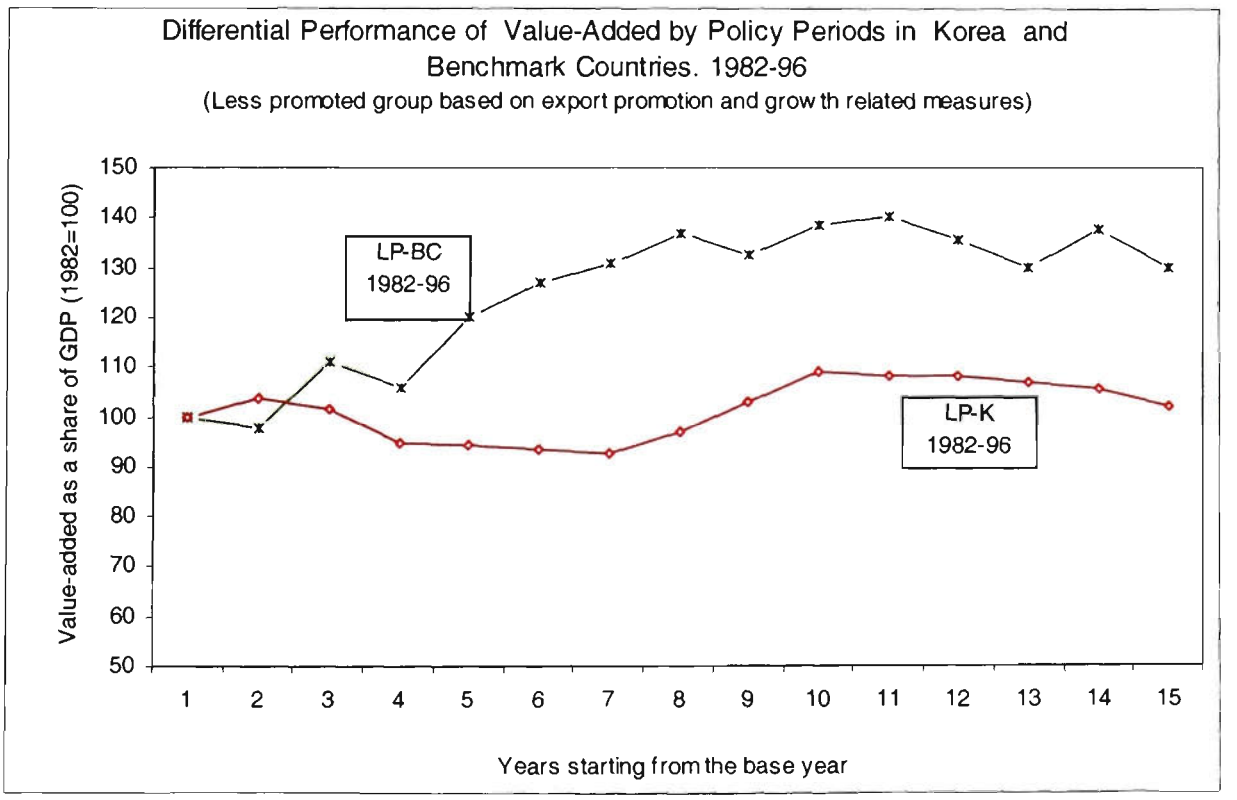


Chart 10.21

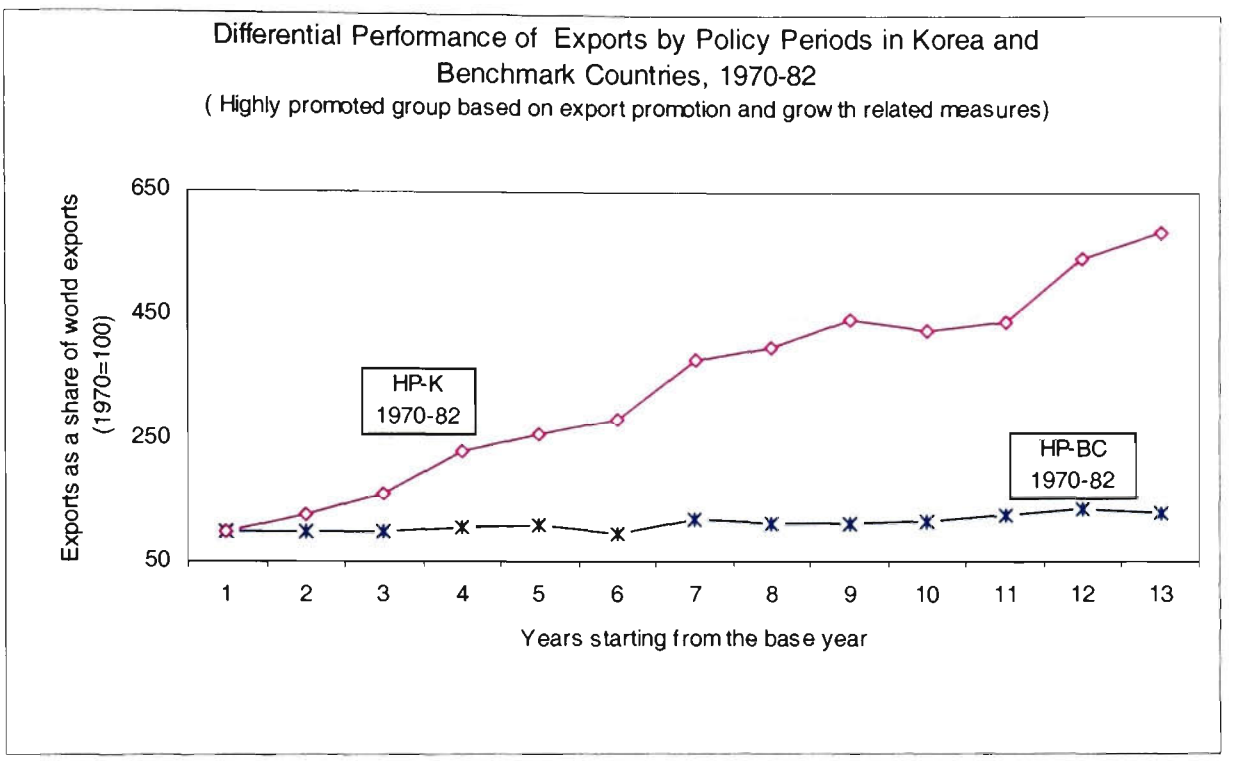


Chart 10.22

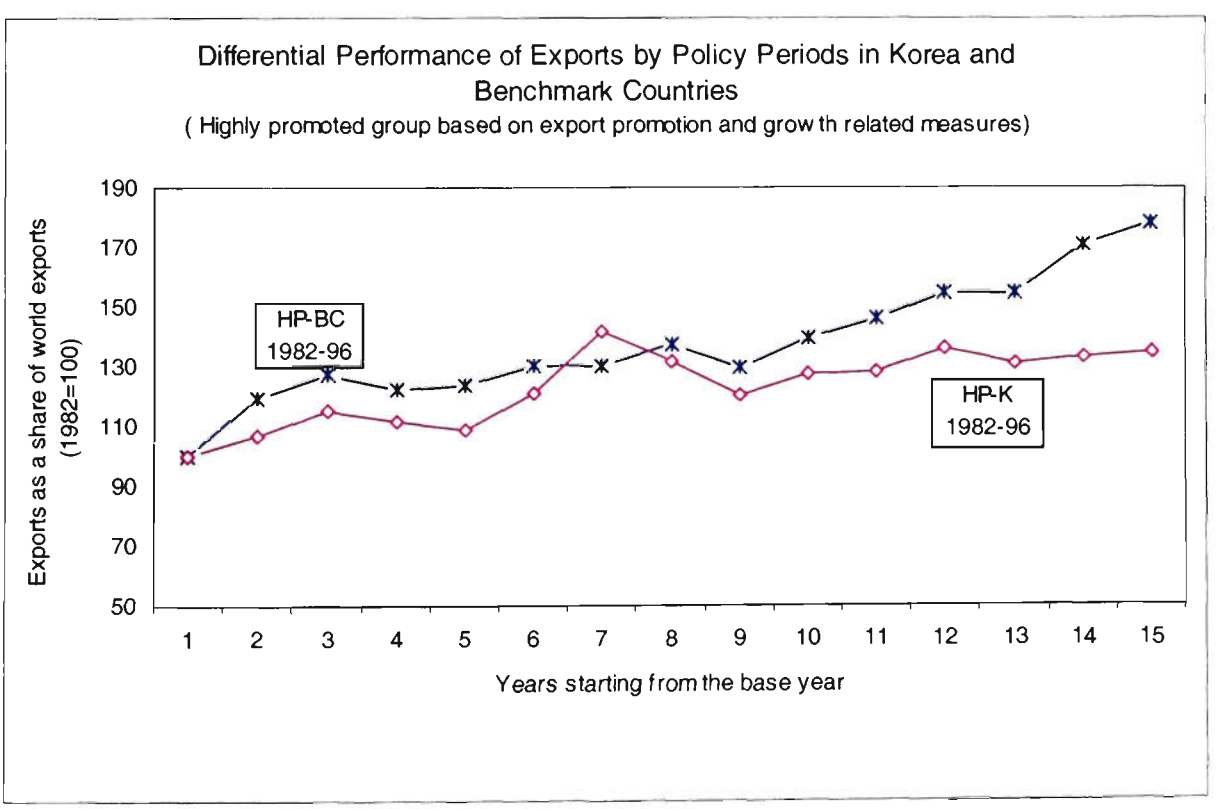


Chart 10.23

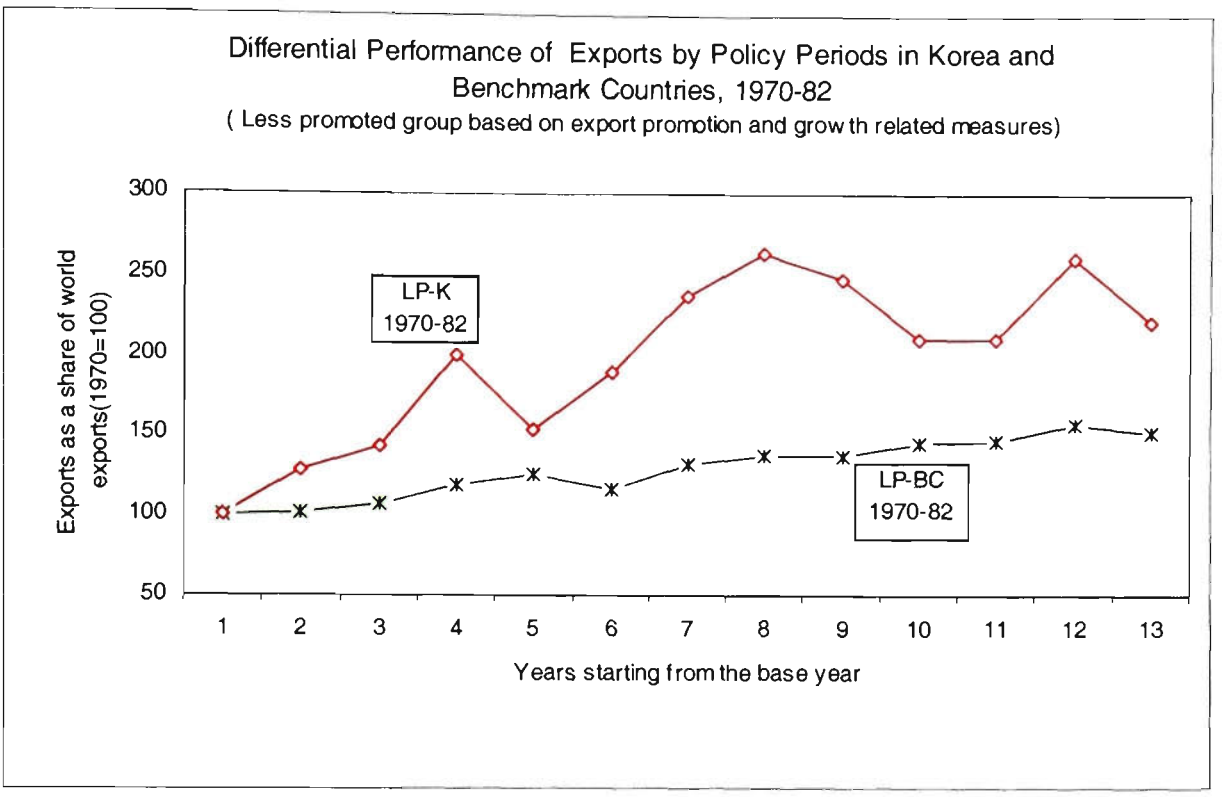
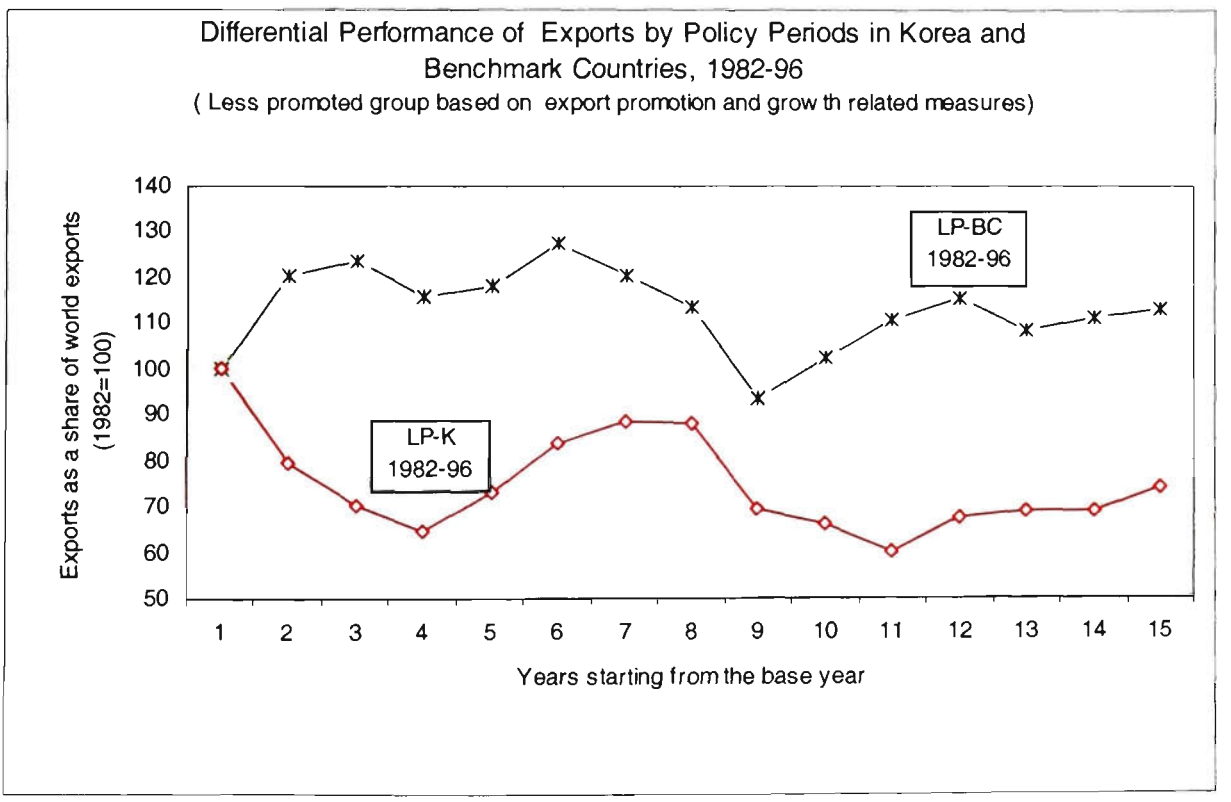


Chart 10.24



the benchmark countries during the high intervention period. After the high intervention period, as can be clearly seen from Chart 10.22, Korean performance in this particular respect remains well behind that of the similar group in the benchmark countries during the observed period except the period 1988-89.

.For the less promoted group (Table 10.5 (columns 8 and 9), Chart 10.23 and Chart 10.24) the estimates again indicate a comparatively higher growth in the export share in Korea than in the benchmark countries during the high intervention period, although the differential is much less marked than for the highly promoted industries. As with value-added, the performance in this particular group in Korea is much weaker than in the benchmark countries after the high intervention period.. The gap in performance of exports as a share of world exports in less promoted group in Korea has widened significantly until 1985. Though the gap in performance in Korea narrowed somewhat during the period 1986-89, remained throughout 1982-1992.

Table 10.6 Growth Rates by Policy Periods, 1970-82 and 1982-96
(Based on export promotion and growth related measures)

Industry Groups	Average Annual Rate of Growth (%)			
	Value-Added as a Share of GDP		Exports as a Share of World Exports	
	1970-82	1982-96	1970-82	1982-96
Highly Promoted Group				
Korea	5.9	3.5	15.9	2.1
Benchmark Countries	-0.3	3.7	2.1	4.2
Less Promoted Group				
Korea	0.6	0.1	6.8	-2.2
Benchmark Countries	0.8	1.9	3.6	0.8

Source: Estimates based on Trade and Production data accessed through IEDB (ANU).

To further investigate performance differences between policy periods, average annual rates of growth for value-added and exports for industry groups have also been calculated. The resultant figures for industry groups based on export promotion and

growth related measures are presented in Table 10.6. For both value-added and exports, the striking feature of the table is the big differences between Korea and the benchmark countries in the highly promoted group in the interventionist period. For these industries and this period, the value added share rose by 5.9 per cent per annum in Korea but fell 0.3 per cent for the benchmark countries, while the export share rose by 15.9 per cent per annum for Korea but by only 2.1 per cent for the benchmark countries. For five of the other six cells shown in the table, the benchmark country growth rate was higher than that of Korea. It is only in exports in the less promoted group in the early period that Korea also has some margin over the benchmark countries. Thus for industry groups defined in terms of export and growth related measures, the stronger relative performance of Korea is heavily concentrated in the highly promoted industries in the interventionist period. This is consistent with a strong policy effect, for policies directed at exports and growth.

10.3.2 Differential Performance of Industry Groups by Policy Periods, based on Import Substitution Related Measures

In this section we will examine the performance differences between industry groups defined in terms of import substitution measures, both in terms of value-added and exports, for the benchmark countries and Korea for the periods 1970-82 and 1982-1996 respectively. Following a similar approach to that adopted for estimating values reported in section 10.3.1, the aggregate values of value-added as a share of GDP and exports as a share of world exports for industry groups for the benchmark countries and Korea are presented in Table 10.7.

As in the results reported in previous section, growth in the value-added share for the highly promoted group, defined in terms of import substitution measures, is also impressive in Korea during the high intervention period. As can be seen from Table 10.7 (columns 2 and 3) and Chart 10.25, the increase in the value-added share for this group in Korea is higher than that of the similar group in benchmark countries during 1970-82, although the differential is only about half that for value added on the export and growth

Table 10.7 Differential Performances of Industry Groups, by Policy Periods in Korea and Benchmark Countries, 1970-1996

Period	Import Substitution Related Measures							
	Value-Added as a Share of GDP				Exports as a Share of World Exports			
	HP-BC	HP-K	LP-BC	LP-K	HP-BC	HP-K	LP-BC	LP-K
1970	100	100	100	100	100	100	100	100
1971	97	102	91	110	108	125	91	129
1972	97	110	82	108	112	151	91	152
1973	107	125	90	151	118	218	104	211
1974	105	127	110	152	132	234	100	176
1975	103	139	86	140	119	281	91	189
1976	107	155	86	131	135	358	116	256
1977	104	164	76	151	129	379	116	282
1978	107	175	84	170	129	415	119	274
1979	110	152	91	165	130	379	127	255
1980	103	157	92	166	145	381	128	265
1981	100	164	90	167	158	464	134	333
1982	106	161	85	165	151	485	128	315
	HP-BC	**HP-K**	**LP-BC**	**LP-K**	**HP-BC**	**HP-K**	**LP-BC**	**LP-K**
1982	100	100	100	100	100	100	100	100
1983	104	103	105	106	112	107	129	86
1984	123	109	117	108	121	117	131	81
1985	121	105	114	101	117	116	121	72
1986	141	111	119	102	118	112	123	79
1987	154	118	131	105	123	126	135	88
1988	157	118	145	107	119	149	132	94
1989	162	119	147	113	124	137	127	94
1990	157	128	139	124	113	123	109	80
1991	165	127	134	135	126	129	115	82
1992	169	128	135	131	130	125	126	85
1993	159	131	128	131	137	131	132	94
1994	154	138	123	133	137	131	125	88
1995	171	148	137	138	151	136	130	84
1996	163	149	128	136	155	136	134	90

Source: Estimates based on Trade and Production data accessed through IEDB (ANU).

Notes: HP-BC – Highly Promoted group in benchmark countries
HP-K – Highly Promoted group in Korea
LP-BC – Less Promoted group in benchmark countries
LP-K – Less Promoted group in Korea

Chart 10.25

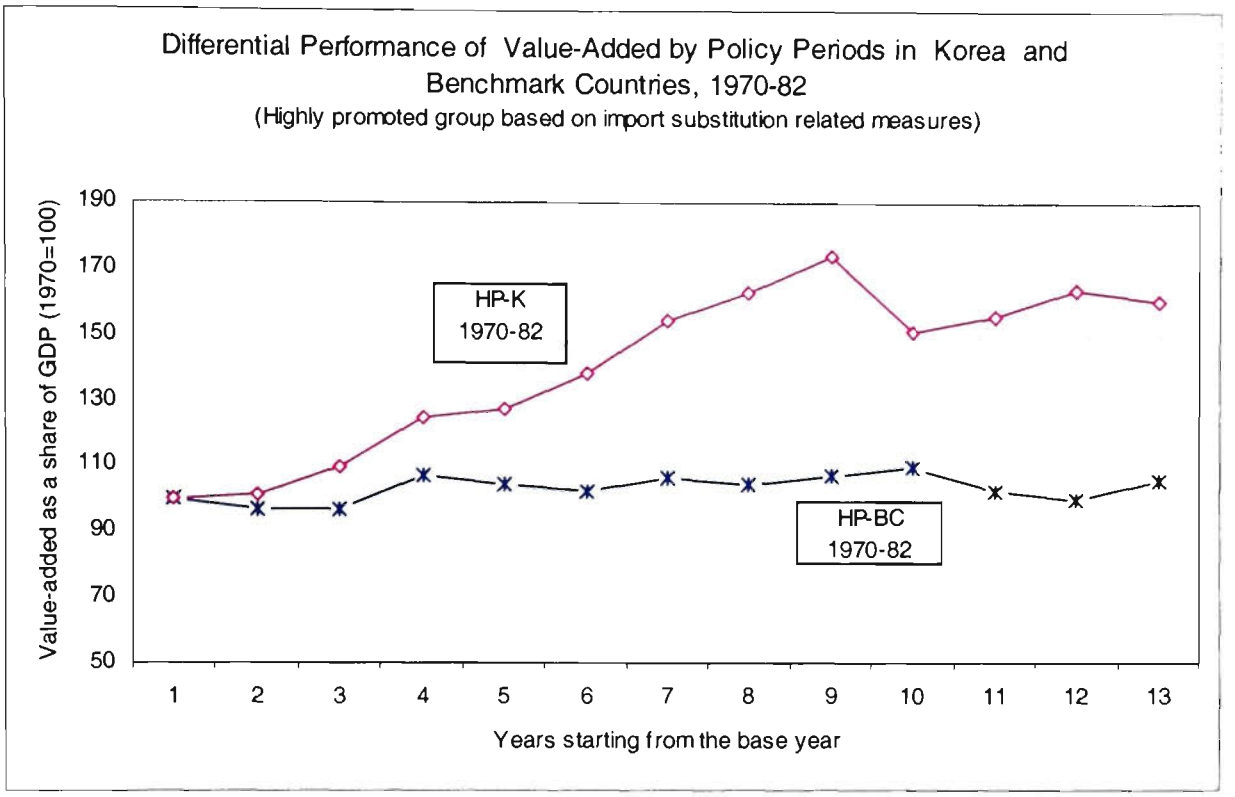


Chart 10.26

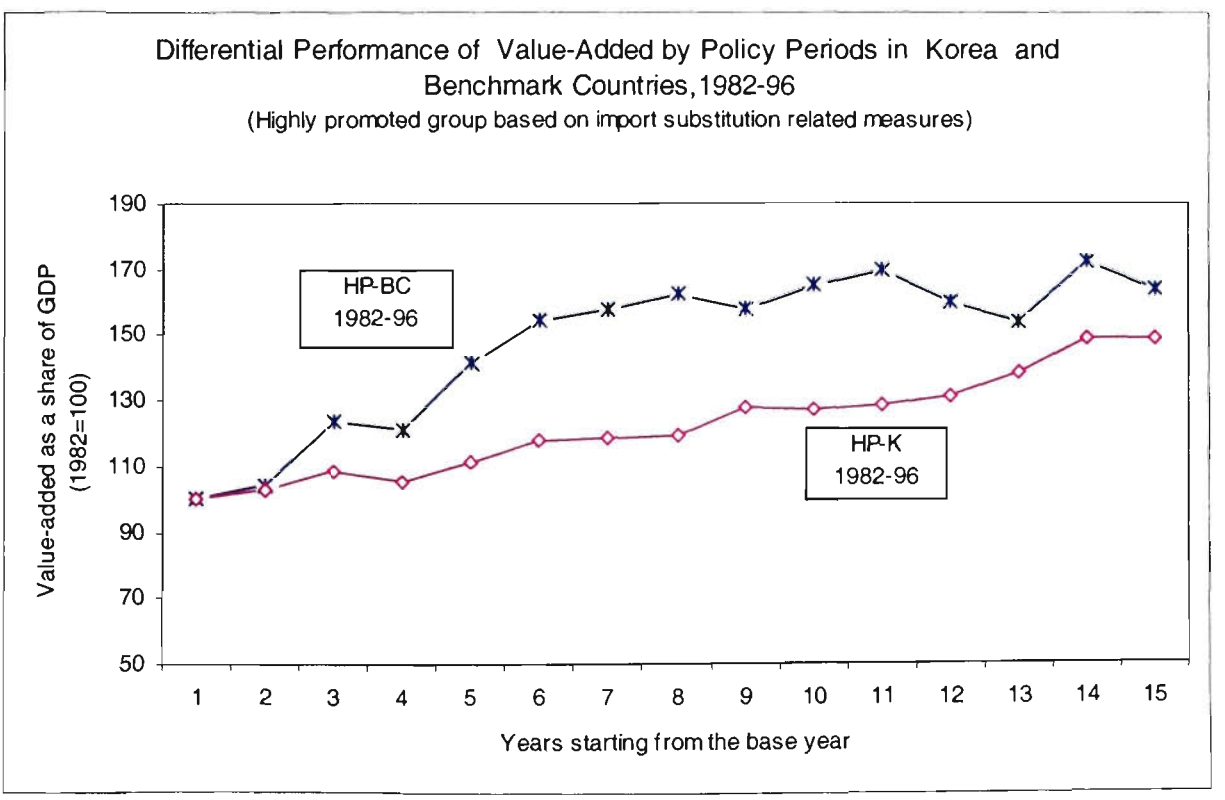


Chart 10.27

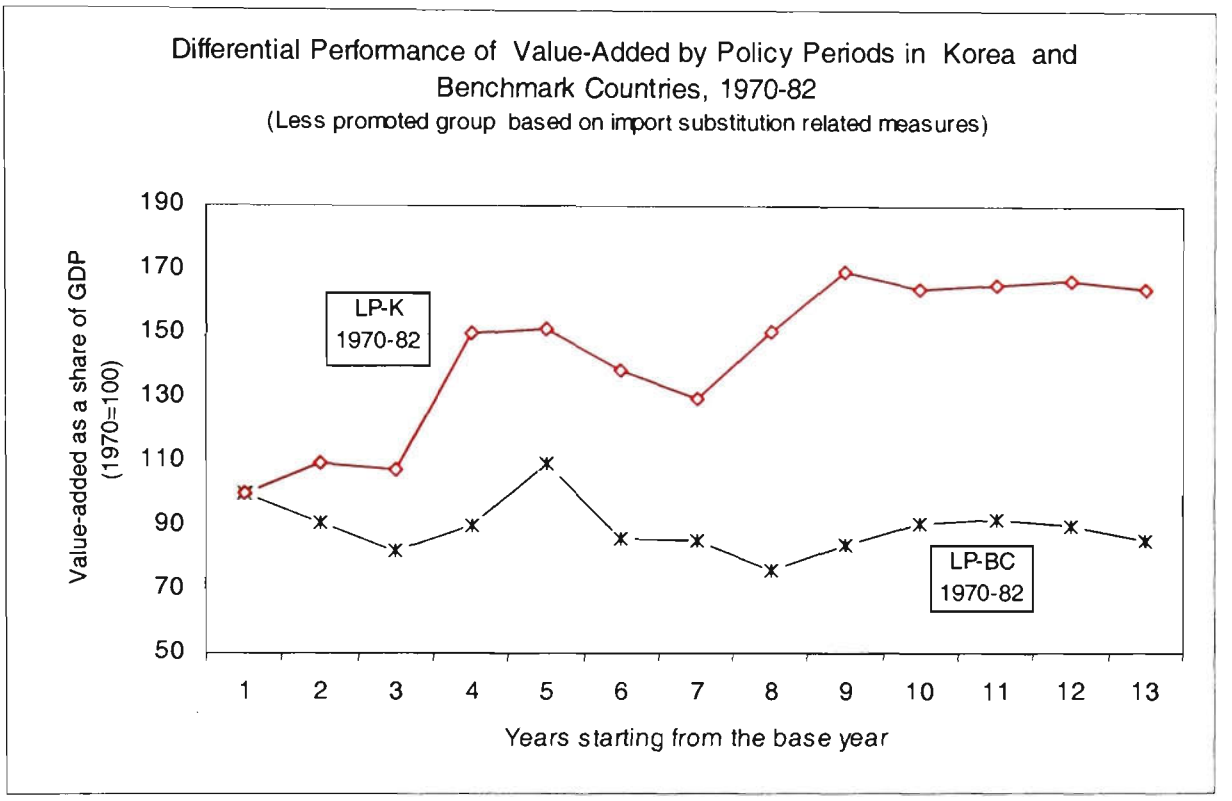


Chart 10.28

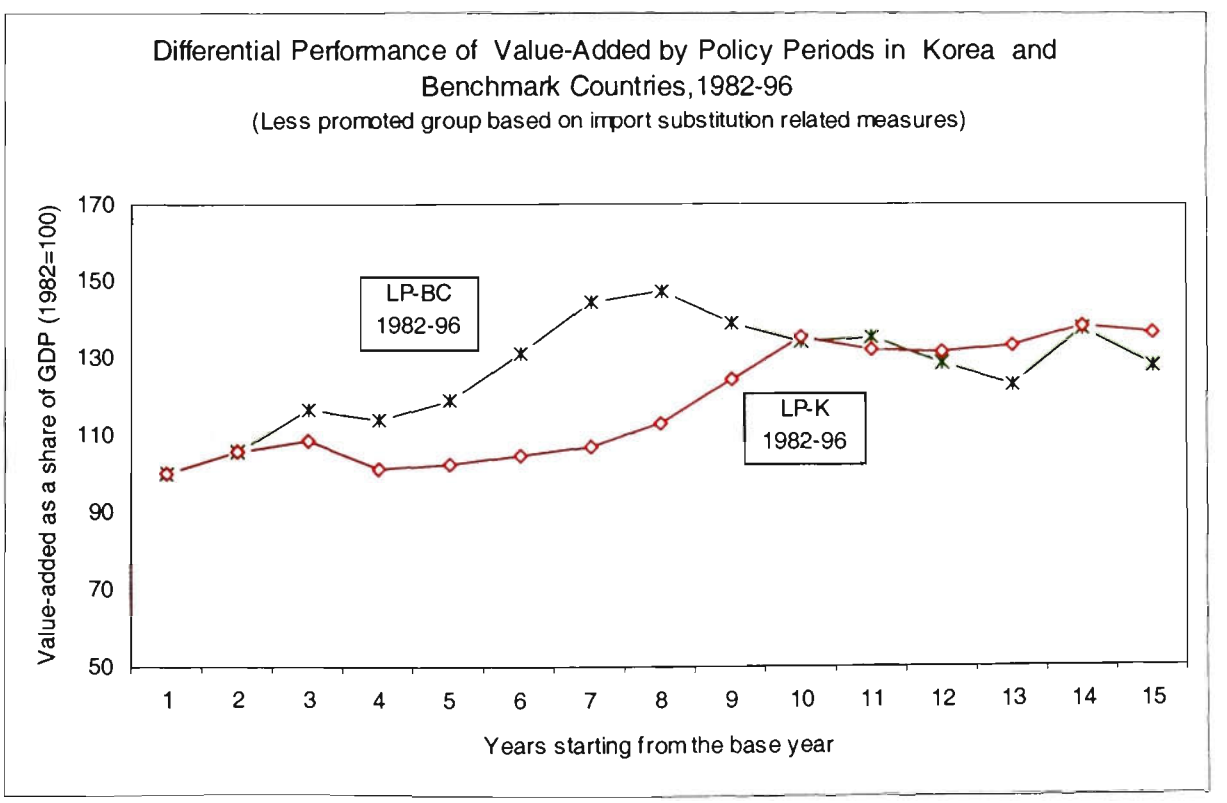


Chart 10.29

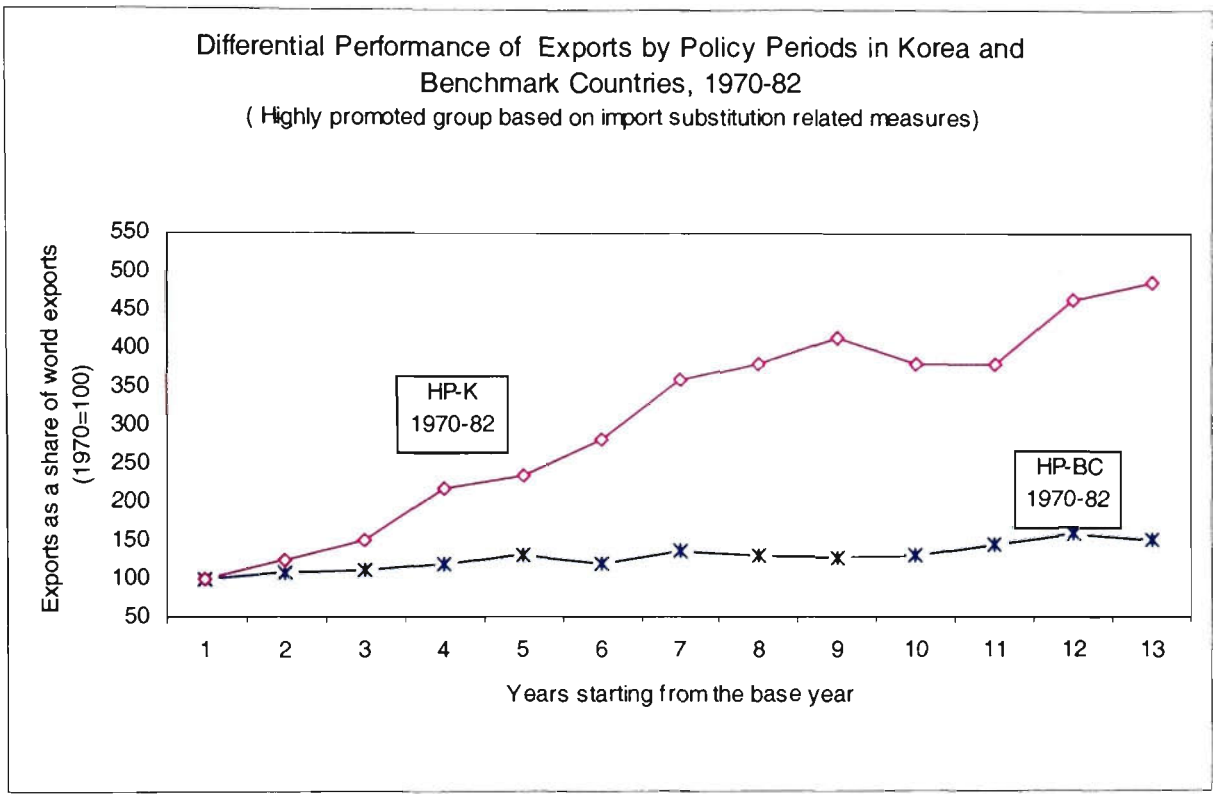


Chart 10.30

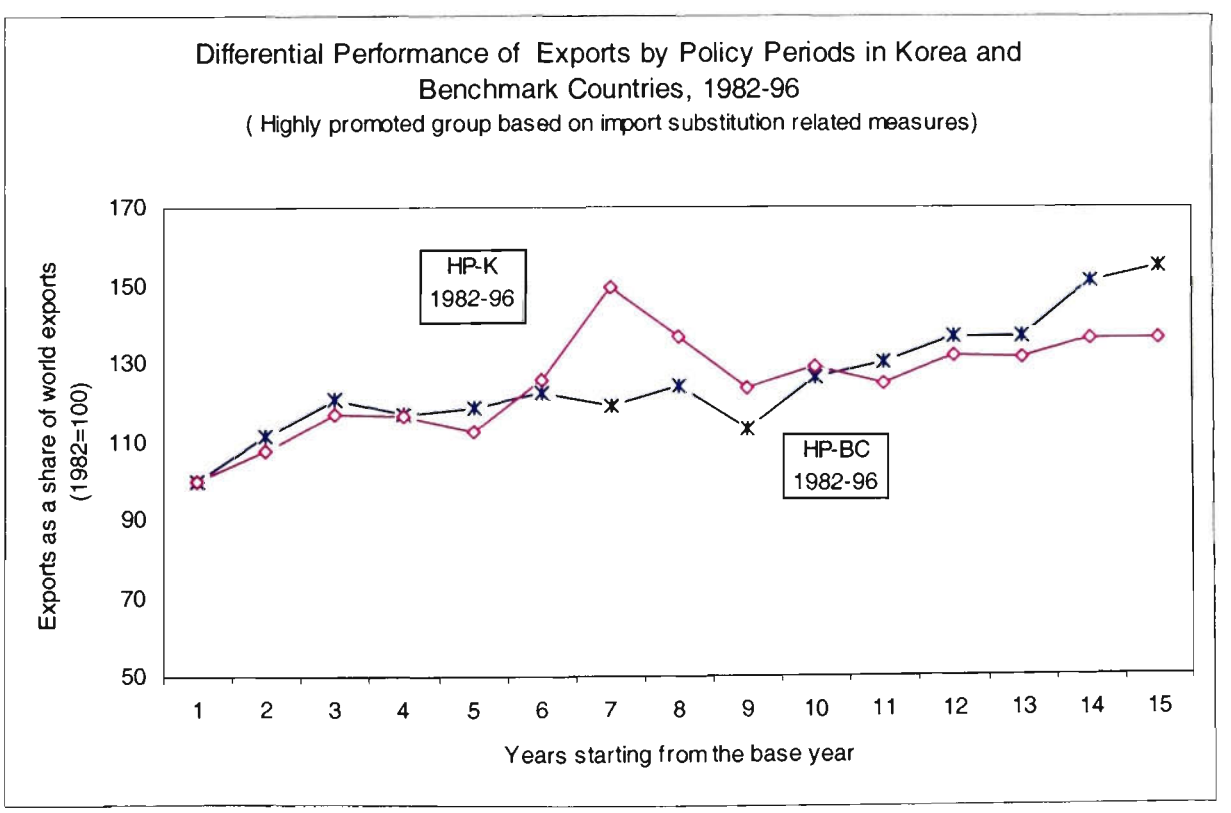


Chart 10.31

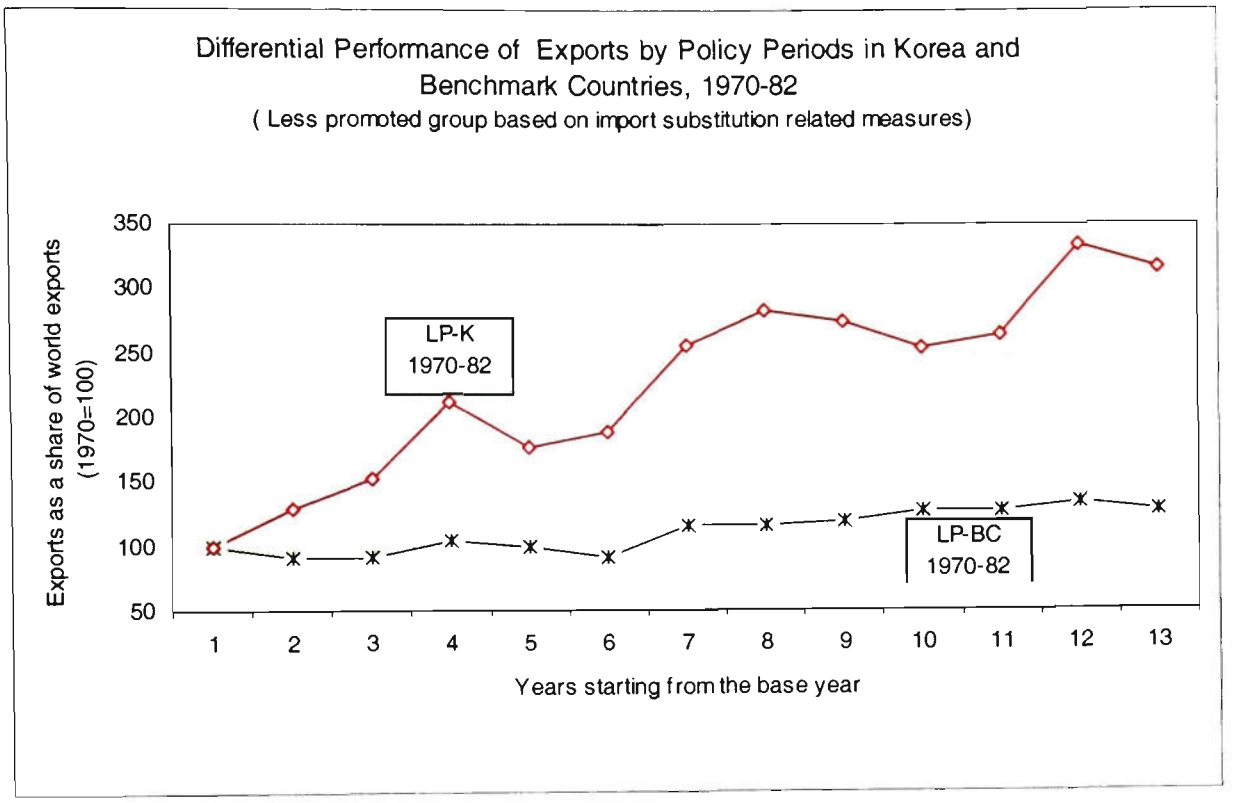
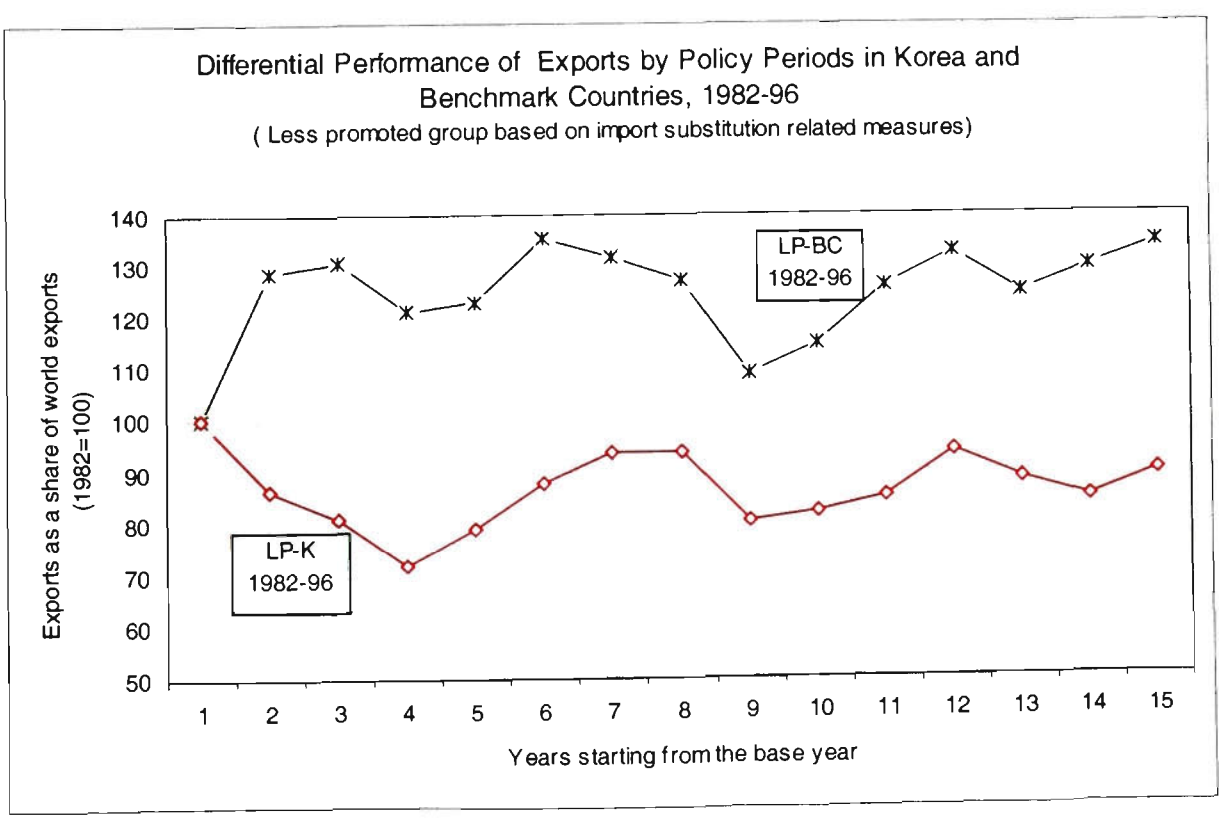


Chart 10.32



definition of the highly promoted group. However, as Chart 10.26 illustrates, this strong relative performance for Korea is not sustained after the high intervention period.

This result might be thought to be indicative of a policy effect, but one thing that is striking when using this definition of the highly and less promoted groups is that similar results are evident as regards to the performance of value-added as a share of GDP for the two groups. Both in 1982 and in 1996 the index values for the value-added share in Korea are quite close for the highly promoted and the less promoted groups, and there is no evidence of superior performance for the policy group. Indeed, relative to the benchmark countries, the performance of the less promoted group was stronger than that of the promoted group. As the estimates of value-added as share of GDP presented in Table 10.7 (column 4 and 5) and Chart 10.27 illustrate, the value added share for the less promoted group in Korea remained well above that of the similar group in benchmark countries during the high intervention period, more so than for the highly promoted group. Further, Chart 10.28 shows that value-added as a share of GDP in the less promoted industries in Korea was stronger than that in the benchmark countries by 1996 (on a 1970 base), in spite of being behind that of the similar group in those benchmark countries until the early 1990s.

As for the results reported in the previous section, exports as a share of world exports in industry groups that are based on import substitution related measures also indicate much stronger results during the high intervention period than during the period afterwards. As can be seen from the estimates in Table 10.7 (column 6 and 7) and Chart 10.29, the performance of exports as a share of world exports in the highly promoted group in Korea is relatively higher than that of the similar group in benchmark countries during the high intervention period. However, the performance of exports as a share of world exports in that particular group in Korea, as the corresponding estimates and Chart 10.30 indicate, was, except for the couple of years in mid 1980s, was weaker than that of the similar group in benchmark countries after the high intervention period.

Exports as a share of world exports in the less promoted group by this definition in Korea also indicate comparatively higher performances during the high intervention period. As the estimates in Table 10.7 (column 8 and 9) and Chart 10.31 demonstrate performance of exports as a share of world exports in this particular group in Korea is comparatively higher than that of the similar group in benchmark countries during the high intervention period. However, performance in this particular group, as the respective estimates and Chart 10.32 illustrate, is not that impressive after the high intervention period. The performance gap widened between 1982-1986, though narrowed afterwards, has continued throughout the observed period.

To further investigate the performance differences between policy periods, average annual rate of growth of value-added and exports have also been estimated for industry groups that are based on import substitution related measures. The resultant estimates for two industry groups, for Korea and benchmark countries for the period 1970-82 and 1982-96, are presented in Table 10.8.

Table 10.8 Growth Rates by Policy Periods, 1970-82 and 1982-96
(Based on import substitution related measures)

Industry Groups	Average Annual Rate of Growth (%)			
	Value-Added as a Share of GDP		Exports as a Share of World Exports	
	1970-82	1982-96	1970-82	1982-96
Highly Promoted Group				
Korea	4.3	2.7	14.1	2.2
Benchmark Countries	0.9	3.2	3.5	3.1
Less Promoted Group				
Korea	4.7	1.8	10.0	-0.8
Benchmark Countries	-0.9	1.4	2.1	2.1

Source: Estimates based on Trade and Production data accessed through IEDB (ANU).

As for the estimates reported in Table 10.8, the average annual rates of growth of value-added and exports for both industry groups in Korea, based on import substitution

related measures, are higher during the high intervention period than during the period thereafter. Further, during the high intervention period the average annual rates of growth of value-added and exports for both groups are also higher than that of the similar groups in benchmark countries, and the reverse results are evident in Korea, for both industry groups, compared to the similar groups in benchmark countries after the high intervention period. The key point, however, is that there is no significant difference between the highly promoted and the less promoted groups in these data, and hence these results are inconsistent with a significant policy effect, for policies focused on import substitution.

The results of the analyses undertaken in 10.3.1 and 10.3.2 can be conveniently summarised in terms of Tables 10.6 and 10.8. For industry groupings defined in terms of export and growth measures (Table 10.6), the striking feature of the table, for both value-added and exports, is the big difference between Korea and the benchmark countries in the highly promoted group in the interventionist period. For these industries and this period, the value added share in GDP rose by 5.9 per cent per annum in Korea but fell 0.3 per cent for the benchmark countries, while the export share rose by 15.9 per cent per annum for Korea but by only 2.1 per cent for the benchmark countries. For five of the other six cells shown in the table, the benchmark country growth rate was higher than that of Korea. It is only in exports in the less promoted group in the early period that Korea also has some margin over the benchmark countries. Thus for industry groups defined in terms of export and growth related measures, the stronger relative performance of Korea is heavily concentrated in the highly promoted industries in the interventionist period. This is consistent with a strong impact of the relevant industrial policies, namely those focused on exports and growth.

For industry groupings defined in terms of import substitution measures (Table 10.8), the estimates for both outcome variables and for both industry groups in Korea show comparatively higher performance during the high intervention period than thereafter. During 1970-82 the average annual rate of growth of both the value-added and the export share for both groups are also comparatively higher than that of the similar

groups in benchmark countries. Substantially opposing results are evident in Korea relative to the similar groups in benchmark countries for both industry groups after the high intervention period. But the key point here is there is no difference evident in the performance of the highly promoted and the less promoted industry groups – for both Korea's performance is stronger than that of the benchmark countries over 1970-82 and, with one marginal exception, weaker than that of the benchmark countries over 1982-96. Thus these data are inconsistent with a strong impact of industrial policies based on import substitution on Korean industrial outcomes.[1]

10.4 Regression Analysis: Industrial Performance and Incidence Measures, Using Panel Data

As a third step in the empirical assessment, we use panel data on incidence and outcome measures for Korea to explore the impact of government intervention on the strong industrial performances of value-added and exports outlined in Chapter 9. In this analysis, we assume that if government intervention in Korea has any substantial impact on industrial performance there should be positive and statistically significant relationship between the measures of the incidence of industrial policies and of the potential outcomes of those policies constructed in Chapters 8 and 9. To examine this statement (with regard to value-added performance) we will apply the following model:

$$Val_{it} = \beta_1 + \beta_2 \cos_{it} + \beta_3 tec_{it} + \beta_4 fdi_{it} + \beta_5 tari_{it} + \beta_6 nont_{it} + \mu_{it} \qquad (1)$$

where i stands for the ith industrial sector and t for the t th time period. The dependent variable Val_{it} denotes value-added as a share of GDP in Korea as compared to benchmark countries (here the difference between the value-added shares in Korea and in the benchmark countries at the sectoral (two-digit) level, 1970-1985). The independent variables are those constructed in Chapter 8 to measure incidence within the limitations of the available data, namely $\cos_{it}$, which denotes the subsidy effect of financial and tax

[1] These results however, require a caution since both export promotion and import substitution measures are simultaneously applied in Korea.

incentives; tec_{it}, which denotes the extent of technology licensing; fdi_{it}, which denotes the incidence of foreign direct investment; $tari_{it}$, which is a measure of the extent of tariff barriers across industries; and $nont_{it}$, which is a measure of non tariff barriers. The variables are defined so that $\beta_2, \beta_3, \beta_4, \beta_5$ and β_6 will be positive and statistically significant if the policies which these variables represent have a positive impact on the value-added share.

As will be clear from earlier chapters, the data available for the panel regression are very limited, being confined by the availability of the incidence measures. We have 32 observations for each of the incidence and outcome variables, consisting of eight industry sectors (at the two-digit level) for each of four time periods. For incidence measures such as *tec* – number of technology licensing projects and *fdi* – number of foreign direct investment projects, data are available only for four time periods (1962-71, 1972-76, 1977-81, and 1982-86). Therefore, data representing *cos* – subsidy effects of financial and tax incentives, are also adjusted for these time periods for the regression analysis. Since data are not available for such time periods for *tari* – average tariff rates and *nont* – non- tariff barriers, for these two incidence measures data for four representative years (1966, 1970, 1975 and 1980) are applied for the regression analysis. Data for outcome variables are only available for the period 1970-1996. To represent outcome variables, the difference of value-added as a share of GDP and also the difference of exports as a share of world exports in Korea compared to benchmark countries for four time periods (1970, 1975, 1980, and 1985) are used for the regression. For this reason, the analysis here can be indicative only.

The association between value-added and incidence measures has been examined using the above noted model (1), with the Shazam statistical package. The initial results showed that all of the variables had the expected sign, but that only two variables (technology licensing and tariffs) appeared to be statistically significant at 5 per cent level. No evidence of autocorrelation and multicollinearity was found. However, there was evidence of heteroscedasticity, both according to Goldfeld-Quandt test (GQ test) and also Brushch- Pagan-Godfrey Test. Given the presence of heteroscedasticity, since the

Table 10.9 Panel Regression for Value-Added [a]

Independent Variables[b]	Coefficients (t value)		
	10.9(a)	10.9 (b)	10.9(c)
Financial and tax incentives	0.0009	0.0003	
	(1.01)	(0.28)	
Technology licensing	0.00005	0.00003	
	(7.69)	(3.14)	
Foreign direct investment	0.000008	0.000004	
	(0.47)	(0.11)	
Tariff	0.0004		0.0001
	(4.45)		(1.67)
Non- tariff barriers	0.00001		0.00004
	(0.16)		(0.41)
R Square	0.7939	0.4890	0.1399
DW	2.09	1.76	2.07
Estimation technique	WLS	WLS	WLS
Number of observations	32	32	32

Notes: (a) The dependent variable is the value-added as a share of GDP in Korea with compared to benchmark countries (difference of value-added between Korea and benchmark countries at two digit level) 1970-1985.

(b) The independent variables are: *cos* – subsidy effects of financial and tax incentives; *tec*- number of technology licensing projects; *fdi* - number of foreign direct investment projects; *tari*- average tariff rates (per cent); *nont* - non- tariff barriers (per cent). These variables are at two-digit level, for the period 1965-1985.

properties of the OLS estimators are no longer reliable, remedial measures were taken by using White's heteroscedasticity consistent variances and standard errors. Since this method is more suitable for large samples, as noted in (Gujarati, 1995, p. 383) corrective measures were applied after selecting a suitable variable to transform the data. To find the suitable variable as weights for transforming data, the error term μ^2_i was plotted

against each explanatory variable. It was found that the variance of μ_i was more likely to be proportional to the variable *fdi* than to any of the other variables. Therefore *fdi* was selected as the suitable variable for transforming the data for model 1.

Table 10.9 reports the estimation results after taking remedial measures for heteroscedasticity. Column 2 of Table 10.9 demonstrates the estimated regression results for model 1, which examines the association between value-added and the incidence measures. These regression results of 10.9 (a) suggest that all the incidence measures may have a positive relationship with value-added. However, only for two variables, namely technology licensing and tariffs, were the coefficients statistically significant at 5 per cent level. Coefficients of those two variables are close to zero and denote very weak relationship.

Likewise, using the same data for the incidence measures, the following model (2) is applied to examine the association between value-added performance and export promotion and growth measures only. As in the previous model, here we expect that β_2, β_3 and β_4 will be positive and statistically significant.

$$Val_{it} = \beta_1 + \beta_2 \cos_{it} + \beta_3 tec_{it} + \beta_4 fdi_{it} + \mu_{it} \qquad (2)$$

The estimated results of model (2), after following similar procedures to those described in relation to model (1), are presented in Table 10.9 (column 3). According to the regression results of 10.9 (b), all the export promotion and growth related measures create a positive impact on value-added performance, but only the technology licensing variable is statistically significant at the 5 per cent level.

Similarly, to examine the association between import substitution related measures and value-added, the following model (3) is applied and we expect that β_2 and β_3 will be positive and statistically significant

$$Val_{it} = \beta_1 + \beta_2 tari_{it} + \beta_3 nont_{it} + \mu_{it} \qquad (3)$$

The estimated results of model (3) are presented in Table 10.9 as 10.9 (c). These results indicate that both import substitution measures show the expected signs, but none of the variables is statistically significant.

In like manner, the association between exports and the incidence measures is examined in this section following a similar model to that used for value-added. The model (4) below is applied here, with similar independent variables and also with the assumptions as noted previously (model 1). In this model, the dependent variable Exp_{it} represents exports as a share of world exports for i th sector at the t th time period, for Korea as compared to the benchmark countries (here, the difference between the export shares for Korea and the benchmark countries at the sectoral (two-digit) level 1970-1985).

$$Exp_{it} = \beta_1 + \beta_2 \cos_{it} + \beta_3 tec_{it} + \beta_4 fdi_{it} + \beta_5 tari_{it} + \beta_6 nont_{it} + \mu_{it} \quad (4)$$

Column 2 of Table 10.10 reports the estimated regression results of model (4), which examines the association between exports and incidence measures, after taking remedial measures for heteroscedasticity. As can be seen from 10.10 (a), three variables (financial and tax incentives, technology licensing and tariff) show the expected signs. The other two variables, namely foreign direct investment and non-tariff barriers, are negatively correlated with export performance. But only one variable (tariffs) is statistically significant at the 5 per cent level.

To investigate the association between export performance and export promotion and growth related measures only, a similar model to that of model (4), with minor alterations, will also be employed. Based on similar assumptions as that of model (2), the following model (5) is estimated and the results appear in Table 10.10 as 10.10 (b).

$$Exp_{it} = \beta_1 + \beta_2 \cos_{it} + \beta_3 tec_{it} + \beta_4 fdi_{it} + \mu_{it} \quad (5)$$

The estimated results indicate that two variables (financial and tax incentives and technology licensing) have expected signs. Like previous results, the variable

representing foreign direct investment is negatively correlated with the performance of exports. However, only one variable (financial and tax incentives) is statistically significant at 5 per cent level.

Table 10.10 Panel Regression for Exports [a]

Independent Variables[b]	**Coefficients (t values)**		
	10.10 (a)	10.10 (b)	10.10 (c)
Financial and tax incentives	0.0009	0.0017	
	(1.08)	(2.77)	
Technology licensing	0.000009	0.000006	
	(1.54)	(0.06)	
Foreign Direct Investment	-0.000008	-0.00003	
	(-0.52)	(-1.35)	
Tariff	0.0002		0.00004
	(2.53)		(0.66)
Non- tariff Barrier	-0.00009		-0.0001
	(-1.03)		(-1.96)
R squared	0.3118	0.2601	0.1175
DW	2.42	2.22	2.5
Estimation technique	WLS	WLS	WLS
Number of observations	32	32	32

Notes: (a) The dependent variable is the exports as a share of world exports in Korea with compared to benchmark countries (differences of exports as a share of world exports between Korea and benchmark countries at two-digit level) 1970-1985.

(b) See note b in Table 10.9.

Similarly, the association between exports and import substitution related measures only has also been examined. For this purpose, with similar assumptions and independent variables as of model (3), the model (6) is estimated and the results are presented in Table 10.10 as regression 10.10 (c).

$$Exp_{it} = \beta_1 + \beta_2 tari_{it} + \beta_3 nont_{it} + \mu_{it} \quad (6)$$

The results of this model (6) indicate that the tariff has a positive sign but it is not statistically significant. The non-tariff barriers variable, though showing a statistically significant coefficient, is negatively correlated with exports.

As noted earlier, these regression results are subject to qualifications for a number of reasons. Firstly, we use pooled regression where time series and cross sectional observations are combined. In such a procedure it is implicitly assumed that the regression parameters do not change over time and that they do not differ between various cross sectional units. It is also assumed that the error variance is homoscedastic and the error term in the observed function at time t is uncorrelated. However, the incidence measures we apply for the regression appear to vary significantly not only from one industrial sector to the other but also from one period to other. Further, significant outliers are evident in the data relating to technology licensing and foreign direct investment. Secondly, these results are based on a small sample. Thirdly, we applied a number of proxies to represent incidence measures, and these are likely to be of limited reliability for detailed econometric work.

Overall, given these various limitations, it is not surprising that the results of this initial regression analysis lead to no definitive conclusions. While these results suggests that incidence measures may have a positive influence on value-added, since all the incidence variables are positively correlated with the performance of value-added, many of the variables are statistically insignificant. It is likely that a much more detailed panel data set, and perhaps a model which takes account of other factors influencing the relationship between incidence and outcome variables, would be necessary for the impact of industrial policy on sectoral outcomes to be assessed by rigorous econometric analysis within the overall framework suggested here.

10.5 Conclusion

In this chapter, three empirical tests have been applied to investigate the question of whether the striking performance of much of Korean industry after 1970 can be attributed to industrial policies. The results of the first two tests are consistent with the view that there was a strong impact of industrial policies focused on exports and growth on industrial performance in Korea over the period 1970-82, although the results of the third test are inconclusive.

In terms of the first two tests, there is a marked difference in the performance of Korean industries, relative to those of the benchmark countries, over the two periods, on the two outcome variables used. However, for groupings defined in terms of export and growth measures, this was true for both outcome variables only for the highly promoted group. For groupings defined in terms of import substitution measures, there is little discernible difference between the comparative performance of the highly promoted and the less promoted group. Thus these results are consistent with the view that industrial policies targeting exports and growth had a significant impact on Korean industrial development over the 1970-82 period. But they are not consistent with the view that industrial policies targeting import substitution had a similar impact, at least when assessed in terms of exports and value added outcome variables.

The third test uses regression analysis on panel data for incidence and outcome variables, to test a simple model of the impact of policy measures on outcomes. While generally the variables have the expected sign, in most cases they fail standard significance tests, and the results can at best be described as inconclusive. This is not surprising, given the severe limitations on the data available for this purpose. A much more detailed panel data set, and a model which takes account of other factors influencing the relationship between incidence and outcome variables, may give more definitive results.

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